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☞ The *Mechanical Engineering* department of this paper will be under the charge of Mr. ZERAH COLBURN.

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American Railroad Journal.

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Saturday, November 26, 1853.

ENTERED according to Act of Congress, in the year 1853, by EDWIN F. JOHNSON, in the Clerk's Office of the District Court of Connecticut.

Railroad to the Pacific--Northern Route.

Its General Character, Relative Merits, etc.

BY EDWIN F. JOHNSON, C. E.

(Continued from Page 742.)

OBSTRUCTIONS FROM SNOWS.

Objections have so frequently been raised to a route for a railroad to the Pacific, lying so far to the north as the one proposed, in consequence of apprehended greater obstructions from snows in winter, as to make it proper to devote some space to the subject.

In passing from the equatorial to the polar regions the rain and snow which falls annually is found to decrease in quantity, and a similar result follows in respect to places in the same latitude in passing from the seacoast into the interior. The density or rarity also of the atmosphere and its temperature have both much to do with its capacity for retaining moisture.

In ascending from the level of the ocean, a reduction of temperature usually accompanies the decrease in density, and both are unfavorable to the retention of moisture, and hence, where there is a very wide extent of elevated country, the rains are often precipitated soon after entering the elevated region and the winds pass on over the remaining portion of the surface, incapable of contributing the rains which are needful for vegetation.

These causes conspire to produce a great diminution in the fall of rain and snow in the interior of continents compared with the quantity which falls in the regions near the sea coast, or in the vicinity of the larger lakes.

In very wide continents, this diminution is so great as to give to the interior often the character of a Desert.

Under the equator the annual fall of rain amounts to an uniform depth on the surface, as computed by Humboldt, for the mean of both continents of 96 inches.

In lat. 19°.....	80 inches.
" " 45°.....	29 "
" " 69°.....	17 "

The above is the estimated average for the latitudes named, varying of course in particular places from local causes and includes both rain and snow.

The portion of the proposed route extending from the Haut Terres of the Mississippi to the Pacific, being the part which will probably be considered the most exposed to be obstructed by snows in winter, is situated in latitude 48° N. nearly, where the average annual fall of rain and snow by the above would be about thirty inches, adding four inches for the greater amount which falls on the continent of America compared with Europe, as ascertained by numerous observations; a quantity which if uninfluenced by other considerations than that of the latitude would give about six inches in depth derived from the snow alone that being the proportion as ascertained by observations in the latitude of Vermont. It has also been ascertained that about twelve inches of newly fallen dry snow gives about one inch in depth of water. This makes about six feet f snow for the entire fall through the winter; a quantity which if not dissipated by the occasional thaws and rains will give when compacted by lying a long time on the surface, a depth of not more than 2 to 3 feet.

The actual fall of rain and snow throughout the region, is not correctly known from observation and can only be obtained approximately from such evidence as is within reach.

At Fort Brady, Sault Ste. Marie, outlet of Lake Superior, lat. 46½° N., the mean for six years, of rain and snow is 29·58 inches. At Prairie du Chien, on the Mississippi, lat. 43° N., it is thirty inches. At the mouth of the St. Peter's it is a little less than this, while at Green Bay on Lake Michigan, it is thirty-five inches, owing to its position on the lake.

Observations made in Minnesota, show that the prevailing winds in winter, are from the north and west, occasionally from the south, but very rarely from the east. This is doubtless true of the country west to the mountains.

The northerly winds at that season bring no moisture the entire surface to, and including the Arctic sea, being fast bound in ice,

Those from the west and south-west, which are frequent in winter west of the mountains, bring with them from the Pacific a large amount of moisture, but meeting near the coast the snow capped summits of the Cascade mountains, the moisture is condensed rapidly, and falls the most of it in rain on their western slopes. Hence the winter in Oregon and Washington, as in California, is the rainy season, in which but very little snow falls in the region adjoining the coast, even as far north as the latitude of 50.°

Whatever moisture is not condensed in passing the Cascade range is probably mostly precipitated on the higher points of the Kooskootskie or Salmon River mountains, so that to the east of them in the vicinity of the Rocky mountains, on the route of the proposed railroad, and especially upon the plains of the Upper Missouri, it is fair to conclude, that but little snow or rain falls in winter, which can properly be considered as the result of the evaporation on the Pacific.

When the winds are southerly, as they are at times in the winter in the region in question, as elsewhere, the humidity with which they may be charged, if not condensed on the high plains of the Great Basin, the Colorado, the Del Norte, and Upper Arkansas, within the limits of which are many mountain ranges of great elevation, are very completely deprived of their moisture, by the cordon of mountains stretching from the Cascade Range of Southern Oregon to the Great Bend of the Missouri, including the Blue mountains, the Green

river mountains, the high summits of the Wind river chain and the Black mountains. North of these, upon the route of the proposed railroad, the quantity of snow or rain deposited in winter by the southerly winds must be very limited.

Farther to the east, in the vicinity of the great lakes which are never completely frozen over, about the Haut Terres of the Mississippi, in northern and eastern Wisconsin, both snow and rain would reasonably be expected to fall in larger quantities in winter than in places farther west, and this appears to be the case from the information obtained

Such is the theory of the snows and rains in winter, throughout the entire region in question, from the Lakes to the Pacific, based upon the natural laws which govern the distribution of moisture over the earths surface. In regard to the facts, it is known that in Northern Illinois but very little snow falls in winter.

In Wisconsin for the entire portion south of Green Bay, the snow seldom exceeds a foot in depth, and more than eight inches will not be found on the average at any one time. In the vicinity of Lake Michigan, it sometimes has a greater depth, but is seldom or never so deep as to render it necessary to resort to the usual means employed at the east for removing it from the railroads.

In the higher and wooded portion of northern Wisconsin, snow sometimes accumulates to a depth of three feet and upwards. In the upper peninsula of Michigan it attains at times a greater depth.

In Minnesota, about the sources of the Mississippi, its depth is somewhat less than in northern Wisconsin.

Seymour in his "Sketches of Minnesota," states that the snow in the pineries of the Mississippi the previous winter, (1849-50) was from "one to two feet deep, and free from crust. In milder winters a crust is sometimes formed." He also states that Dr. Williamson who has resided in that country fifteen years at the Winnebago Agency, above the latitude of 46° N. informed him that "the snow was deeper the last year than any winter since he had resided there. It was however, only 2½ feet deep." This is very much less than near the Atlantic coast in the same latitude, in the valley of the Mohawk, N. Y. in a more southern latitude and at a much lower elevation it has been known to be twice that depth. At Burlington, Vt., two degrees farther south and 346 ft. only above the sea, the average fall of snow for ten years past according to Prof. Thompson has been 85 inches, the maximum 123 and the minimum 48 inches.

In the narrow mountain passes of Vermont and New Hampshire, which are now penetrated by railroads on which the trains run uninterruptedly at all seasons, the snow falls in greater amounts and accumulates to a greater depth than at Burlington.

The Upper Mississippi, unlike the rivers which have their sources on either side of the Alleghanies, has no winter or spring floods, none which can be attributed mainly to the melting of snows which have accumulated on the high grounds from whence it originates.

The river rises slowly under the influence of late spring rains, attaining its greatest elevation in June, which at Dubuque is fifteen to eighteen feet, and falls in the same gradual manner, causing comparatively but little injury to property.

In respect to the country west of the Coteau du Missouri in the Missouri valley, we have the evidence of Lewis and Clark, and others, that the snow does not fall in any great quantity or attain any great depth in winter. In the journal of the former, and of Serjeant Gass, of their winter sojourn at Fort Mandan, they state that slight falls of snow were noticed on the 14th, 15th and 24th of November, amounting, altogether, to four or five inches only. On the 27th and 28th of November it fell to the depth of thirteen inches, and did not fall again until the 2d January. On the 8th and 10th of Dec., "the buffalo darkened the prairies in great numbers." They killed several, and "found the snow six to eight inches deep and sometimes eighteen inches."

On the 3d and 14th of Jan. were slight falls of snow and on the 14th February, the last during the winter. On the 13th February Capt. Clark returned from a buffalo hunt and he remarks, that on the last day he "walked 30 miles on the ice and through snow in *many places knee* deep." On the 6th of March the snow was evidently all gone as the Indians were burning the prairies to get an early crop of grass. No mention is made of the use of snow-shoes during the winter by themselves or by the natives, or of their having been used in former winters.

The fact that the buffalo and the elk were able to subsist on the prairies through the winter shows that the snow could not have been very deep. The rains through the winter were less frequent than the snows. In noticing a fall of rain on the first of April, they state that "with the exception of a few drops at two or three different times, (January 1st and February 2d,) this is the first rain since the 15th of October last," and they remark in another place that "the air is remarkably dry and pure in this open country, very little rain or snow either winter or summer."

Catlin states that "the horses which the Indians ride in this country, (the Mandan villages,) are invariably the wild horses which are found in great numbers on the prairies, and have, unquestionably, strayed from the Mexican borders, into which they were introduced by the Spanish invaders of that country, and now range and subsist themselves in winter and summer over the vast plains of prairie that stretch from the Mexican frontier to lake Winnipeg, on the north, a distance of 3000 miles." Writing from the mouth of the Teton river, on the Missouri, he says that, "it is very evident that as high north as lake Winnipeg, seven or eight hundred miles north of this, the buffalo subsists itself through the severest winters," and also that "the snow in these regions often lies to the depth of three or four feet, being blown away from the tops and sides of the hills in many places, which are left bare for the buffalo to graez upon."

In the Journal of Mr. Hunt, in Irving's Astoria it is stated that the Shayen Indians at the head of the Shayen branch of the Missouri, catch horses on the prairies and "repair to the Arikara villages, where they exchange them for corn, beans, pumpkins, etc." These villages are on the Missouri river in Lat. 46° to 47° N. a short distance below the Mandans.

At the mouth of the Yellow Stone, from information derived from a gentleman connected with the American Fur Comp'y, it appears that the snows seldom accumulate to a depth as great as three feet. The average or ordinary depth in that part of the Missouri valley is 18 to 24 inches only. This also appears to be about the average depth throughout the remaining portion of the valley to the mountains.

The Missouri, like the Mississippi, is not swollen by winter or early spring floods. At the period of the breaking up of the ice at Fort Mandan in March, the river, according to Lewis and Clark, rose but a few inches. The winter and early spring rains are not sufficiently copious, combined with the melting of the snows which cannot be very deep in the lower vallies, to produce floods at that season.

At a later period the rains, joined to the influence of a summer temperature upon the snows collected in the higher parts of the mountains, cause the river to rise very gradually, attaining its greatest height in July when it soon after subsides in the same gradual manner.

Such of the tributaries of the Missouri and of Clarks river as are situated in the vicinity of Lewis' Pass are never much swollen at any season. According to Lewis and Clark the banks of Medicine river near the Missouri, which do not exceed 3 to 5 five feet in height, are never overflowed. The Cokalahishkit, although its banks are not high, is never overflowed. This could not be the case if there was any great accumulation of snow in the vallies of these streams in winter. Even the Missouri river at a point 100 miles nearer to the snow-capped summits of the Fremont group, with banks of only eight feet high, is never overflowed, and Capt. Clark says of the Yellow Stone, which has its sources still nearer to the snow-crowned summits of the Wind river and Black Mountains, that "its banks, although low, are never subject to be overflowed except in the vicinity of the mountains."

Lewis and Clark when passing the Kooskootskie Mountains found the snow in the last days of June from 2 to 8 feet deep, on the average, for 60 miles. One week afterwards they were on the summit of Lewis' Pass, between Clarks river and the Missouri, where every vestige of snow had disappeared and vegetation was in an advanced state; an evidence both of the less amount of snow upon that summit and of its lower elevation.

The obstruction offered by snows to the movement of trains on a railroad depends upon their depth, suddenness of their fall, and accumulation by drifting, and also by the width of the passage or valley through the mountains occupied by the road. It will be seen by the description already given of Lewis' Pass that the valley is an open one, and is not enclosed between very high mountains and consequently the land will not be exposed to slides or avalanches from adjoining slopes. Wherever accumulations of snow may chance to occur from drifts, ample space exists for its displacement by the usual and thoroughly effective means resorted to in similar cases on all railroads; means which, upon a road doing a large business, are always at command, and being constantly applied, will make it impossible for the snows to accumulate in so large a quantity upon the track,

in the region in question, as to form a very serious obstacle to the movement of trains.

Throughout the entire distance from the lakes to the Rocky Mountains, it is quite certain that the quantity of snow is very limited, and that it falls mostly in November and the first part of December. After that period there is very little humidity in the air or evaporation to produce it from local causes, and the temperature is then too low for it to reach that region from any very remote source. The winters are in general characterized by a fine bracing atmosphere, greate uniformity in the weather, more so than is experienced near the coast, the cold occasionally intense, but on the whole quite as agreeable and probably more favorable to health than the winters of New England.

Upon that portion of the proposed route lying between the Rocky and Cascade range of mountains the snow falls to a greater depth than upon the portion last under consideration. Com. Wilkes informs us that in the Columbia valley north of the latitude of 49°, a region covered mostly by dense forests, "the snow lies on the ground from November to April or May on an average six feet deep."

At the missionary station at Lapwai, on the Kooskootskie river 150 miles south and elevated 1600 feet above the sea, there is usually but little snow and the "grass continues green the year round." The mean annual temperature at this point is 53° F. At Walla Walla situated to the west of Lapwai and elevated 1300 feet above the sea, scarcely any snow falls the entire winter. On the plains of the Columbia 100 miles further north "the snow never covers the earth more than a foot deep."

Capt. Bonneville informs us that he the left Green River valley of the Colorado for the upper part of the Salmon river valley for the reason that the winters in the former were represented as more severe, the snow frequently falling to the depth of several feet. He remained, however, in the latter place no longer than the last of December, being obliged to remove to the valley of Lewis' river. The snow, while he remained, was not so deep as to prevent his horses from getting access to the grass, and during that period and for the remainder of the winter the incursions of the Blackfeet Indians, whose territory is east of the Rocky Mountains, were frequent, showing that the Passes through the mountains at that season were not only passable but afforded sustenance for the horses of the Indians, the number of which were increased on their return by captures from their enemies.

Capt. Bonneville, in his march to Lewis river, found the snow on the great lava plain, which forms a striking feature in the character of its valley, only twenty inches in depth. His encampment on the river was probably in latitude 43¼° N. between Fort Hall and Henry's fork, at an elevation of about 4700 feet, Fort Hall being 4500 feet by Fremont's measurement. Towards the last of February he returned to the Salmon river. The snow upon the plains was then 30 inches only in depth. Upon these plains and in the mountain defiles leading from them, the buffalo remain throughout the winter. In one of these defiles Capt. B. found the "weather moderate" and "the grass sprouting more than an inch in height."

Father De Smet who ascended Clark's river in a *canoe* from below Kalispel Lake to the Mission of St. Mary's, a distance of 250 miles, in the beginning of February 1845, states the depth of the snow in the valley to be five feet. The mean elevation of the valley is probably about 2600 feet. From the preceding it is inferred that from three to four feet is probably a liberal estimate, for the mean depth of the snow upon the portion of the proposed route between the Rocky and Cascade Mountains.

In Irving's Astoria it is stated that "but little snow falls throughout the winter in the plains and vallies of the lower part of the Columbia, and that it rarely lies on the ground more than two days at a time."

The remaining portion of the route to the Pacific, lying west of the Cascade or President's Range, it is well known is not subject to falls of snow of any great depth. It is upon that part only which is situated in the more elevated portion of the mountains that the road will be liable to obstructions from this cause. Lieut. Johnson passed this Range the last of May in a lat. 47¼ N. and found snow on the summit at the height of about 5000 feet. The summit was five miles across, and the snow extended down from it on the east side, making the distance covered by the snow in all, eight miles, and the greatest depth, ten feet. This snow being below the line of perpetual congelation was all accumulated the winter previous, and had probably wasted considerably, so that the depth was undoubtedly much greater, and it extended much farther down the sides of the mountain.

Whatever the actual depth or extent of the snow may have been, as an obstacle to the running of trains on a railroad it should not be considered very formidable. At a lower elevation such as there is much reason to expect can be obtained for the passage of the road, not exceeding, it is supposed, 4000 feet above the sea, there would not, it is believed, have been any snow visible at the period of Lieut. Johnson's visit unless in some very deep and narrow ravine where the sun's rays could not penetrate. The distance across the highest part of this range is short comparatively, so that in the event of its being deemed advisable to adopt a plan of construction for a road more than ordinarily expensive to obviate the liability to obstructions from snows, it will not enhance very materially the cost of the work.

The apprehension that any extraordinary expense will need to be incurred to prevent obstructions from snows on the Cascade range, may prove entirely groundless when the road comes to be located and constructed.

It is by no means certain that a pass, even lower than that assumed, may not be found, or that the mountains may not be in great part avoided and the gradients lessened, without very materially increasing the length of the road or carrying it into the territory of a foreign power.

It is known that a complete opening through the Cascade range exists near the international boundary, where it is passed by Frazer's river, and it is known also, that Frazer's river at that point is very near to the boundary, and may possibly be so near as to permit the location of the road within the limits of the United States, and thus avoid the additional rise and fall and higher gradients and embarrassments from snows consequent upon the passage of the mountain by a more direct route. The branch to the main line which will doubtless ultimately be carried down the valley of the Columbia to the mouth of that river, will avoid entirely, all the difficulties of the Cascade range, whether proceeding from the snow or from any other cause.

When the New York and Erie railroad was projected, fears were entertained by many, that if built, it might be rendered useless for a portion at least of every winter because of the snows which fall and accumulate often to a great depth in the elevated country through which it passes. In a report in relation to that road in 1838 I remarked "that the snow in the latitude of New York does not fall on the average more than about 20 or 25 days in the year, and upon a road doing a constant business with locomotive steam power cannot as an obstruction exceed the ordinary interruptions to the transportation upon canals from breaches in the banks, repairs and floods and other failures during the season of navigation."

This opinion has been fully confirmed by the subsequent experience on that road, and upon other roads in the northern and eastern States where the snows constitute a more serious obstacle to the regular running of trains in winter, than any thing of a similar nature to be met with on the entire line of the proposed railroad of nineteen hundred miles from Lake Michigan to the Pacific Ocean, with the single exception of the few miles embraced in the passage of the Cascade Mountains already noticed.

It may be remarked in concluding this branch of the subject, that whatever may be the difficulties from snows on the proposed northern route, it is quite certain they will not only be equalled, but will probably be surpassed by those which will be experienced on any route which can be found between it and the 35th parallel of latitude and terminating not farther south on the Pacific than San Francisco.

This follows from the greater humidity of the atmosphere due to the latitude and from the great elevation of the Sierra Nevada and Rocky Mountains. It was, it will be remembered, not very far from Santa Fee that Col. Fremont lost one-third of his party and all of his animals in the snows of the Sierra San Juan, and although the elevation he attained was considerably greater probably, than that of the pass which he intended to take, still it is evident that the snows must at times fall to a depth sufficient to be an impediment of rather a serious nature to a railroad. Even upon the high plains of the Arkansas snow storms have been known to prevail with such suddenness as nearly to overwhelm men and animals when unable to find shelter from their violence. What is true of the mountains and plains of the Upper Del Norte in this respect, is also true in a greater degree of the Nevada Mountains in California, as may be seen by Col. Fremont's description of his passage across them in the winter of 1843-4, and also by reference to the journal of McKinstry who was one of a party of emigrants, numbering eighty in all, nearly one-half of whom perished in the snows in their attempt to cross the mountains in the fall and winter of 1846 and 1847.

For the reasons above stated, it is probable that

the obstructions which will be experienced from snows on any of the other proposed routes north of the latitude of 85° will be much greater than upon the one under consideration, while upon the latter they will not be of so formidable a character as not to be readily surmounted by a resort to the proper means, without involving any very great or unusual expense for the purpose, provided the road is judiciously located and constructed.

To be continued.

The Liverpool Docks.

The docks now in course of construction, as we learn from the *Liverpool Mercury*, at the extreme north end of the port of Liverpool, (the New York of Great Britain,) are rapidly approaching completion. The Huskisson dock, which is one of the largest in the world, is constructed for the accommodation of ocean steamships. The locks at the south end are finished. The dock itself is ready to receive vessels, water having been let in at the last spring tides; and workmen are busy paving the pier and parts of the quay, and constructing the locks at the north end. Large as the Bramly-Moor, Nelson, and other of the northern docks, finished in 1848, are, they are outrivalled by this new evidence of what the genius and enterprise of Liverpool can effect. The width of the east lock-gates is 80 feet, 10 feet wider than the lock-gates of any dock hitherto constructed at this port; the west lock-gates, 45 feet. The water area of the dock, 14 acres 3,451 yards, with quay-space to the extent of 1,122 yards. The water area of the east lock is 4,682 yards, with quay-space of 242 yards; the water area of the west lock, 3,650 yards, with quay-space of 330 yards. No sheds have at present been erected on the dock-quay, which is still in an unfinished state; but sheds have been constructed on the lock-quay, where arrangements have been made for unloading vessels and for the reception of cargoes. A large space of the west end of the lock quay is set apart for a timber-yard, and the remaining portion by the side of the locks, will be used as the sites for sheds in which to stow away dry goods. The total water area of the wet-docks along the margin of the Mersey, belonging to the corporation of Liverpool, is now 177 acres 3,684 yards, with a quay-space of 12 miles and 1,412 yards; and of dry-basins, an area of 20 acres 892 yards, with quay-space of 1 mile 712 yards; making a total of 197 acres 4,576 yards of water area. and 14 miles 712 yards of quay-space; with a length of 5 miles and 20 yards of river wall. Independently of this large extent of dock space, other docks are yet to be formed, and excavations in reference to this object are going forward.—The walls surrounding the Huskisson dock, as well as the north docks which have recently been constructed, and the Normanlige towers, to serve as offices to the gate-keepers, are built of granite, and combine considerable beauty and neatness with extraordinary durability and strength.

Red River Raft.

The removal of this obstruction has been again advertised for contract by the United States Government, the former contractor having failed to complete the work, and abandoned the enterprise. By a communication which appears in the National Intelligencer, it seems that the raft is so formidable that its removal is thought impracticable. According to this writer, the great raft was originally one hundred miles in length, and not ten miles of it has ever been removed. Through this whole extent the river is obstructed by an immense aggregation of logs and trees, which have to be dug up and sawed out. The attempt to remove this raft was abandoned many years ago, and a new route adopted for navigation, by way of Bayou Pierre Shreveport, Lake Caddo, and a canal from thence into Red River above the raft, which is used to this day. This, however, is also annually obstructed by a raft at the upper end formed by every freshet.

On Hollow Railroad Axles.

By J. E. McConnell, of Wolverton.

[*Paper read at the Institution of Mechanical Engineers.*]

The selection of the tubular form of axle originated from the knowledge, that with a considerably less weight of material in the form of the tube, a much greater strength can be obtained to resist torsion, deflection by pressure or weight, or concussion from blows. The resistance of a solid system to deflection and torsion, increasing in proportion to the fourth power of the diameter (or the square of the square), but the weight increasing only as the square of the diameter, two solid cylinders, having the respective diameters of 4 and 5 inches, or 1 to 1¼, will have a proportionate weight of 16 to 25, or 1 to 1½, but a resistance of 256 to 625, or 1 to 2½. Then, if a hollow of two-thirds the diameter be made in the larger axle, its weight will be diminished ⅓ (⅔ × ⅔ = 4-9 or ⅓ nearly), and its resistance only one fifth (⅔ × ⅔ × ⅔ × ⅔ = sixteen-eighty-firsts, or one-fifth nearly), and the comparison with the smaller solid axle will then be 1 to 1¼ in diameter, 1 to ⅞ in weight, and 1 to 2 in resistance, being double the resistance, with ⅛ less weight.

The use of hollow axles was tried some years ago, but was not continued, the main objection being, that there appeared a great difficulty of insuring, by the particular mode of manufacture adopted at that time, a sufficient uniformity of thickness of the sides of the tube throughout, and also of the soundness of material. The mode adopted consisted of rolling two or three bars of a semicircular cross section, which were welded together with butt-joints, but with no internal pressure, and with solid ends where the bearings came. These axles, having no mandril or internal pressure during the process of welding, were found to be of a very uncertain strength throughout the axle, and the weakest point might be close to that part where the greatest force or strain would be exerted.

To overcome these objections, a mode of manufacturing railway axles has been introduced by the writer, which, it is believed, effectually accomplishes the object in view, securing the utmost strength with the least possible amount of material, uniformity of structure of the iron, perfect equality of thickness of material, and soundness of manufacture.

The plan adopted is as follows:—A number of segmental bars of the best quality of iron are rolled to a section, so as to form, when put together ready for welding, a complete cylinder, fig. 1, about 1½ times the diameter of the axle when finished, the bars fitting correctly together, so as to have no interstices, and overlapping in such a manner as to insure a perfect and sound weld when completed, as shown in fig. 1.

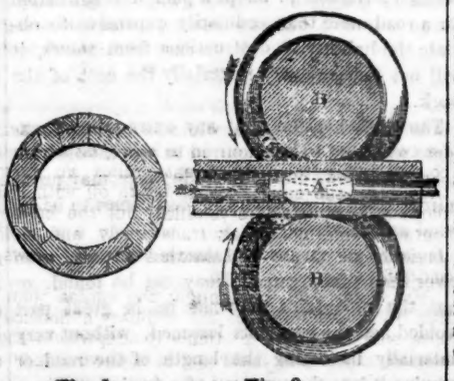


Fig. 1.

Fig. 2.

This cylinder of loose segmental bars is temporarily held together by a screw-clip, and each end being put into the furnace until a welding heat is produced, the bars are then partially welded together, and the clip removed. The whole cylinder is then placed in the furnace, and brought to a proper welding heat; it is then passed through a series of rollers B, B, fig. 2, which have each a mandril of an egg form A, in the centre of the circular opening, which are attached and supported on the end of a fixed bar, the bar being firmly secured at the opposite end, to resist the end pressure or strain during the process of rolling. The mandrils are made of cast-iron, chilled, fitting on like a socket on the end of the bar to a shoulder, and they are secured by a screw-nut, so that they are easily removed when required.

The motion of the rolls is so arranged, by a reversing-clutch on the shaft, that as soon as the axle-cylinder has been drawn clear through, the motion is reversed, and the axle which has been drawn on the mandril-rod, is again drawn back through the same openings in the rolls; it is immediately passed through the next smaller groove of the roll, with a decreased size of mandril, and again reversed back through the same groove in a similar manner, and so on through a series of grooves in quick succession, each decreasing in size, and consequently increasing the compression and strength of the iron of which the axle is formed, and by the last groove it is passed through it is reduced to the proper diameter. At each time it is changed from one groove to another, the axle-cylinder is turned by the workmen a quarter round, so as to equalise the pressure on every part of its surface, to insure uniformity of the compression of the iron, and thoroughly complete a sound welding throughout every part of the axle.

The specimens before the meeting showed the soundness and perfection of the manufacture, as a proof of which, in every test applied, either by blows on the outer surface or by an immense splitting pressure, by driving a mandril in the interior, there has never been found in any one instance a failure of the weld, although the test has been applied to pieces cut off the extreme end, where it might be supposed the welding of the cylinder of the axle, from various causes, would not have so good a chance of being perfect.

The axle at this stage, after being welded and drawn down in the rolls to the proper size, is taken at once to a hammer, where it is planished between semicircular swages over its entire surface. A small jet of water plays upon it during this process, which enables the workman to detect at once, by the inequality of colour, any unsoundness in the welding. From the hammer it is taken to the circular saws, where it is cut accurately to the length required, and ready to have the bearings formed upon it.

On coming from the hammer, the axle is found to be perfectly clean both inside and outside, the scale being entirely removed. The ends are then re-heated, and gradually drawn down by a hammer to the proper dimensions and form of the journals, a mandril being inserted in the end of the tube during the process of hammering.

The formation of the journals can also be produced by a rolling-machine, constructed of tables the entire length of the axle, rolling transversely, each table being a duplicate of the other, and matrixes of the axle when finished. Or in another way, by two sets of rollers, each set consisting of three rollers running vertically, being of the same diameter, and driven at the same velocity, formed exactly to the shape of the bearing, and set the proper distance apart from shoulder to shoulder of the journals.

The manufacture of these axles has been intrusted to the Patent Shaft Company, and a great amount of credit is due to Mr. Walker, the managing partner of that firm, for the very excellent system he has adopted and carried out in the process of manufacture.

As an illustration of the saving in dead weight, take, for instance, a railway employing 15,000 wagons and carriages, and assume each of these vehicles to run on an average 10,000 miles per annum. The weight of two axles of the solid description finished, is say 5 cwt., and if replaced with hollow axles of equal strength, the weight per vehicle may be reduced 1⅛ cwt.; this taken over

one mile of the above stock per annum will be 11,250,000 tons, and assuming the cost of traction for locomotive power at ¼d. per ton per mile, the saving will amount to £11,700, per annum, without taking into account the other advantages, and also the saving to the permanent way, &c.

In the samples of axles submitted to the meeting, two different kinds of bearings were shown, the parallel bearing with the rounded shoulder, and also the double conical bearing, such as is used on the Great Northern, Great Western, Bristol and Exeter, South Wales and South Devon railways. In either description of bearing, the hollow axle is good, although it is believed that the conical bearing for *either* the solid or hollow axle has less tendency to injure the texture of the iron during the formation of the journal than the parallel shouldered axle. and it appears a matter well deserving the consideration of the Institution, to ascertain what, under all conditions, is the best form of axle bearing.

Experiments, conducted by Mr. Marshall, the Secretary of the Institution, have been tried for the purpose of ascertaining the comparative strength of the hollow and solid axles to resist a transverse strain. Each axle was supported on massive cast-iron blocks, fixed at a distance of 4 ft. 11 in. apart, to represent the support given by the rails to the axle. A cast-iron block weighing 18 cwt. was then let fall on the centre of the axle from a height of 12 feet, and the extent of bending was measured. The axle was then turned half round, and another similar blow given on the opposite side, bending it in the opposite direction. This proceeding was repeated until the axle was broken. The general results of these experiments are as follows:—

An *Old Solid Axle*, 3¾ inches diameter in centre, and 4¼ inches at ends, which had been at work three years, was bent 8¾ inches by the first blow; it was nearly straightened by the second blow in the opposite direction, then bent 10 inches by the third blow, and with the sixth blow it was broken in the centre square across.

A *New Solid Axle*, of the same dimensions, was bent 9¾ inches by the first blow, then nearly straightened by the second blow, and bent 9½ inches by the third blow, and by the fourth blow 2½ inches, and by the fifth blow it was broken ¾-inch from the centre. The appearance of the racture was crystalline over three-fourths of the section, the remaining part tough fibre.

A *New Hollow Axle*, 4⅝ inches diameter throughout, was bent 5 inches by the first blow, nearly straightened by the second blow, and bent again 5 inches by the third blow. The ninth blow bent it 4½ inches, and the tenth blow 1⅝ inch. Up to the fifteenth blow it was bent alternately, the bends varying from 2 to 3½ inches. There was no appearance of failure or cracking, but a slight rising of the surface at the fifteenth blow The blows were continued to the twenty-seventh, the bends varying from 2 to 3⅝ inches, and at this blow a fracture took place across the middle of the axle 1½ inch long. The twenty-eighth blow bent it ⅜-inch, and closed the fracture on the opposite side made by the preceding blow. By the twenty-ninth blow it was fractured two-thirds through, and bent 9½ inches, the appearance of the fracture being very fibrous.

A second series of experiments was made, to ascertain the comparative strength of the journals of the hollow and solid axles to resist breaking.

Each axle was supported on an anvil, with the inner shoulder of the journal projecting 1½ inch beyond the edge of the anvil, to represent the support of the axle in the nave of the wheel; 100 blows with two 24 lb. sledge-hammers were then struck upon the upper side of the outer end of the ournal, the men being changed after striking each twelve or thirteen blows alternately. The amount of bending of the journal was then measured, and the axle turned half over, and another 100 blows similarly given on the opposite side of the journal; the same proceeding being then further repeated. The general results of these experiments are as follows:

An *Old Solid Axle* with 3 by 5 inch journals, that had been at work three years, had one journal broken off with 205 blows, and the other with 53 blows; both fractures were square across the journal at the shoulder.

A *New Solid Axle*, with 3 by 6 inch journals, had the journal broken off with 570 blows, the fracture being irregular in form, and fibrous.

A *New Hollow Axle*, with 3 by 5 inch journals, had 400 blows on the journal, which bent down the end ⅝-inch, and produced a longitudinal split on the under side 3¾ inches long, but no transverse fracture.

A *New Hollow Axle* same size journals, received 300 blows on the end of the journal, which bent it down ⅛-inch, and split the journal longitudinally on both sides, but caused only a slight transverse crack, near the shoulder, ¾-inch long.

The experiments on transverse strength by a heavy weight falling on the centre of the axle, and giving the blow on opposite sides alternately, show that the hollow axle is nearly double the strength in that respect of the corresponding solid axle, the amount of bending being only 5 inches instead of 9¾ inches; and the number of blows required to break the hollow axle being 29, whilst the solid axle broke at the fifth blow, shows the hollow axle to be greatly stronger in resistance to fracture.

The hollow axle became ⅛-inch oval in the centre after receiving the seventh blow, and it was only ¼-inch oval after receiving the twenty-eighth blow just before fracture; being bulged outwards 1-16 inch at each side, and 1-16 inch inwards at top and bottom from the original circular section.

The experiments on strength of journals show, that instead of the journals breaking off square and short at the shoulder, as in the solid axles, the hollow-axle journals stand a considerably greater number of blows, and then only split up longitudinally, instead of breaking off transversely, being a very important advantage in point of safety in working.

In the course of the discussion which followed the reading of the paper, it was remarked, that in the fracture of the hollow axle all the iron appeared fibrous, but the fracture of the solid axles was mostly crystalline; that the saving in weight of the hollow axles was about two-fifths theoretically to obtain the same strength, but it had been taken at one-third of the solid axles, to be on the safe side. The hollow axles were being extensively applied on the North-Western, Midland, and Great Northern Railways, and more than 500 had already been made; some had been at work for nine months with entire satisfaction.

Mr. McConnell observed, that whatever was the nature of the strain, and the change produced by concussion, the effect of the continued blows and concussion to which a railway axle was subjected, must be greatly diminished when the axle had a large hollow through the centre, instead of being entirely solid, as the effect of a blow on one side would be mostly lost in the vacant space of the centre, instead of being all communicated through the mass of the axle. He showed specimens of a hollow and a solid axle, which had been run hot for two hours without oil in a lathe, at a speed corresponding to about twenty miles an hour travelling; the solid journal broke off with 179 blows quite short and crystalline, but the hollow journal would not break transversely, and split longitudinally in several places with 400 blows, and did not appear injured.

Mr. Adams said, he thought the conical journals were preferable to the ordinary cylindrical ones, and they were particularly adapted to the manufacture of the hollow axles, by avoiding the sudden shoulder. He had found the conical journals less liable to heat than the others when well fitted; in the cylindrical journals, as square shoulders were found preferable in practice to shoulders much rounded, it was important to maintain a uniform strength of metal at the shoulder.—*Civil Engineer's and Architect Journal* for October, 1853.

Motive Power on the Broad Gauge.

The illustration which the equipment of the New York and Erie railroad furnishes of the necessity for excessive power for operating the broad gauge is a useful one in the consideration of the relative resistances of the gauges. The Erie road, when the nature of its traffic and the gradients of its route are regarded, shows a weight and capacity of motive power found on no other road in the country.

The trains are no longer, and the freight per train no heavier, than upon the majority of first class freight roads of the narrow gauge. Our object is to compare the motive power of this road with those of the narrow gauge, whereby a fair inference may be readily drawn of the increased resistance due to an increased width of track.

Engines, Nos. 1, 2 and 3, upon the New York and Erie road are outside connections, built by Wm. Norris. They have thirteen inch cylinder, twenty inch stroke, and four feet drivers and truck, 448 square feet of tube surface; forty-four and a half do. fire box surface, and ten and one-eighth do. of grate. Weight 32000 lbs., of which 22,300 lbs. are on drivers. Steam used at one revolution 6.145 cubic feet.

Engines 4 and 5, by Norris, have 10¾ inch cylinders, eighteen inch stroke, four drivers, 4 feet 7 inches in diameter, and four trucks. 343 square feet of tube surface, 33 do. of fire box surface, and seven and a half do of grate. Weight, 30,700 lbs., of which 21,100 lbs. are on drivers. Steam used at one revolution 3.782 cubic feet.

No. 6, by Rogers, Ketchum and Grosvenor, weighs 40,625 lbs.; on drivers 24,250 lbs. No. 7, by same builders, weighs 48,200 lbs. of which 31,300 lbs. are on drivers. Cylinders outside, fifteen and a half by 22 inches, four five feet drivers, and truck.

No. 9, by Baldwin, has outside connection, cylinders fifteen inches diam., stroke 18 inches, 6 forty-six inch drivers, no truck; eight hundred and sixty feet tube, forty-two and a half fire-box, and eight square feet of grate surface. Weight, all on drivers, 44,200 lbs.

No. 10, by Norris, outside cylinders, twelve and three-eight inches by twenty-six inches, four five feet drivers and truck; 708 square feet tube, fifty-four do. of fire box, and ten and a half square feet of grate surface.

Weight 43,920 lbs., of which 26,880 lbs. are on drivers.

Nos. 11, 13 and 17, by Swinburne, Smith and Co., have the half crank, cylinders seventeen inches by twenty inches stroke. Four six feet drivers and truck: 943½ square feet tube, sixty-eight and a half do. fire-box, and 12 7-8 do. of grate surface. No. 11 weighs 50,910 lbs., of which 28,750 lbs. are on drivers. No. 17 weighs 53,400 lbs., of which 31,900 lbs., are on drivers. Nos. 14, 15, and 16, by the same builders, same as above, only five feet drivers, fifty-nine and a half square feet of firebox surface, and twelve and one-eighth square feet of grate. Weigh', 50,900 lbs., of which 27,800 are on drivers. Steam used at one revolution, 10.508 cubic feet.

No. 12, by Rogers, Ketchum & Grosvenor; half crank, seventeen inch cylinders, twenty inch stroke, six five feet drivers and truck, 1080 square feet tube, sixty-seven do. fire box, and fifteen do. of grate surface. Weight 58,000 lbs., of which

42,300 lbs. are on drivers. Steam used at one revolution 10.508 cubic feet.

Nos. 18 and 19, by Rogers, Ketchum & Grosvenor; half crank, seventeen inch cylinder, twenty inch stroke. Four six feet drivers and truck; nine hundred and twenty-two and a-half square feet tube, sixty-seven and one-eighth do. fire box, and thirteen do. of grate surface. Weight 56,500 lbs., of which 35,750 lbs. are on drivers. Consumption of steam same as No. 12.

Nos. 20, 21, 23 and 27, by M. W. Baldwin, same as eighteen and nineteen, except nine hundred and thirty-eight square feet tube, sixty-five and three-fourth fire box and 12⅞ do. grate surface. Weight 56,500 lbs., of which 34,800 lbs. are on drivers. Nos. 22, 24, 25 and 26, by same builder, same as 20, except five feet wheel and sixty square feet fire box surface. Weight 54,500 lbs., of which 32,600 lbs. are on drivers.

Nos. 28, 29 and 32, by Rogers, Ketchum and Grosvenor, same as Nos. 18 and 19. Nos. 30 and 31 by same builders, have five feet drivers and sixty-one and a half square feet of furnace surface. Weight 54,500 lbs., of which 33,500 lbs. are on drivers.

Nos. 33, 34 and 35, first class freight engines, by Rogers, Ketchum & Grosvenor. These have half cranks, eighteen inch cylinders, twenty inch stroke; six five feet drivers and truck. Boilers 48 inches diameter, containing one hundred and ninety-eight tubes, one and three-fourth inches in diameter, and thirteen feet long. 1179 square feet of tube, 72 do. of fire box, and 14⅔ do. of grate surface. Weight, 65,000 lbs., of which 49,000 lbs. are on drivers. Amount of steam expended at one revolution 11.781 cubic feet. These engines, having twenty-four tons of adhesive, and eight and a half tons of truck weight, usually take 12 or 13 eight wheel loaded cars, as a full train, on the sixty feet grades, between Piermont and Sufferns.

Nos. 36 and 37 by Swinburne, Smith & Co., are very nearly the same as No. 17, by the same builders, but are about half a ton heavier. Nos. 38 and 39 are about the same as 15 and 16, only a little heavier. All the engines of this class have forty-four inch boilers, and from one hundred and seventy-five to one hundred and seventy-nine tubes, one and three-fourth inches in diameter and eleven and a half feet long.

Nos. 40, 41, 42, 43, 44, and 45, by Rogers, Ketchum & Grosvenor, have nearly the same dimensions and weight as No. 30 and 31 by the same builders. The general dimensions are identical. The weight may be given as twenty-eight tons, of which 16 tons are on the drivers.

No. 46 and 47, by Swinburne, Smith & Co., are the same as Nos. 14, 15, and 16, by the same builders.

No. 48 by Swinburne, Smith & Co., has half crank, sixteen by twenty inch cylinders, four 5 feet drivers and truck. Boiler has 781½ square feet tube, sixty and a quarter do. fire box, and thirteen do. of grate surface. Weight 50,700 lbs., of which 32,100 lbs. are on the drivers. Steam used at one revolution 9.308 cubic feet.

Nos. 49, 50, and 51, and Nos. 67, 68 and 69, by Swinburne, Smith and Co., have half cranks; seventeen inch cylinders, twenty inch stroke, six five feet drivers and truck. 1025¼ square feet tube, sixty-one and a half do. firebox, and thirteen and a half do. of grate surface. Weight, averages 62,500 lbs., of which 45,500 lbs. are on the drivers. Steam used at one revolution 10.508 cubic feet.

Nos. 52, 53 and 54, built by Boston Locomotive Works, have inside connections; cylinders fifteen inches diameter, twenty inches stroke. Four five feet drivers and truck. Seven hundred and eleven square feet tube, fifty-nine and a half do. fire box, and ten do. of grate surface. Weight 47,920 lbs., of which 30,050 lbs. are on drivers. Steam used at one revolution 8.181 cubic feet.

Nos. 55 and 56 are half crank engines of twenty-seven and a half tons weight, built by Rogers, Ketchum and Grosvenor. No. fifty-five uses 9.308 cubic feet, and No. 56, 8.181 cubic feet of steam at one revolution.

Nos. 57 and 58 are first class grade engines, by M. W. Baldwin. They are used as pushers on 68 feet grades. They have eighteen and one-fourth inch cylinders, twenty-three inch stroke, eight connected drivers of four feet diameter. The boilers are 46 inches diameter, and contain 147 tubes, two inches diameter and fourteen feet long. 1077 square feet of tubes, 67¼ do. of fire box, and 14 do. of grate surface. The four forward drivers are combined in a truck, although it would seem that the coupling rods would prevent any sensible vibration. The whole weight of these engines is 73,700 lbs. of which 45,700 lbs. are on the four forward drivers alone, giving 11,425 lbs., or nearly five and three-fourth tons, on a single wheel.—Steam used at one revolution 13.927 cubic feet.

Nos. 59 and 60, of the same general construction as the 57 and 58, are lighter. These have seventeen inch cylinders, twenty-two inch stroke, eight connected drivers of forty-six inches diameter. 938 sq. feet tube, sixty-one and one-fourth do. fire box and thirteen do. of grate surface. Weight 66,750 lbs., of which 39,450 lbs. are on the four forward drivers. Steam used at one revolution 11.559 cubic feet.

Nos. 61, 62, and 63, by Taunton Locomotive Manufacturing Company. These are inside connections with seventeen by twenty inch cylinders four five feet drivers and truck. Boilers forty-four inches diameter, containing 182 1¾ inch tubes, 11½ feet long. 959 square feet tube, 90 do. of firebox, and 16⅛ do. of grate surface. Weight 59,400 lbs., of which 39,900 lbs. are on drivers. These engines have much dead weight, owing to heavy cast iron jaws, foot boards, steam pipes, separate cut off motion, etc. Steam used at one revolution 10.508 cubic feet.

Nos. 64 and 65 are extreme outside connections, built by Rogers, Ketchum & Grosvenor. They have 17 by 20 inch cylinders, four 5 feet drivers and a truck. 795 square feet tube, 57⅔ do. fire box, and 13¼ do. of grate surface. Weight, 55,600 lbs., of which 35,600 lbs. are on drivers. Steam used at one revolution 10.508 cubic feet.

No. 66, inside connection, by Rogers, Ketchum and Grosvenor, 17 by 20 inch cylinder; four six feet drivers and truck, 872¾ square feet tube surface 75½ do. fire box and 14 do. of grate surface, Weight not given; probably 28¼ tons, of which about 18½ tons are on drivers.

Nos. 70 and 71, inside connections, by Swinburne, Smith & Co., seventeen inch cylinders, 20 inch stroke; four 6 feet drivers and truck. 943 1-2 square feet tube, 71¼ do. fire box and 18 1-2 do. of grate surface. Weight 53,800 lbs. of which 33,900 lbs. are on drivers. Steam at one revolution 10.508 cubic feet.

Nos. 72 to 83, inclusive. Inside connections,—freight engines,—by Swinburne, Smith & Co., used principally on Western division, upon 40 to 50 feet grades, and generally with light trains. 17 inch cylinder, 20 inch stroke, six four and a half feet drivers and truck. Boilers 46 inches diameter containing 157 tubes. two inches in diameter, and 13 feet long; 1068¾ square feet tube, 69¼ do. fire box, and 13½ do. of grate surface.

We regret that these engines have not been weighed, but judging from other engines we should estimate that 31 tons would be a fair allowance, of which 23 tons are on the drivers.

Nos. 84 and 85, extreme outside connections, by Norris' Brothers. Cylinders 14 inches dia. by 32 inch stroke. Four 7 feet drivers and truck. 708½ square feet tube, 54½ do. firebox, and 11¼ do. of grate surface. Weight 57,450 lbs., of which 38,950 lbs. are on the drivers. Steam used at one revolution 11.403 cubic feet.

Nos. 86, half crank, by R. K. & G. 17 inch cylinder, 20 inch stroke; six five feet drivers and truck. 923⅓ square feet of tube, 67½ do. firebox, and 13⅓ do. of grate surface. Weight 65,175 lbs., of which 47,000 lbs are on the drivers. Steam used at one revolution 10.508 cubic feet.

No. 87 and 112, inside connections, by Beston Locomotive Works. 15 inch cylinder, 20 inch stroke; Two 5½ feet drivers, truck, and one pair of trailing wheels. 616 square feet tube, 66 do. of firebox, and 11⅔ do. of grate surface. Weight not given. Steam at one revolution 8.181 cubic feet.

Nos. 88 and 89, extreme outside connections by Ross Winans. 19 inch cylinders, 22 inch stroke, eight connected driving wheels of 43 inches diameter. 918½ square feet tube, 85½ do. of firebox, and 20½ do. of grate surface. Weight, all on drivers, 56,000 lbs. Steam used at one revolution of drivers 14.439 cubic feet.

Nos. 90 to 99 inclusive; inside connections, by Boston Locomotive Works. Cylinders 16 inches by 20 inches. Four 5½ feet drivers and truck 719⅔ square feet tube, 62⅔ do. of firebox and 10 do. of grate surface. Weight 49,510 lbs., of which 30,840 lbs. are on drivers. Steam used at one revolution 9.308 cubic feet.

Nos. 100 to 105 inclusive; inside connections, by R. K. & G. 17 inch cylinder, 20 inch stroke, four 6 feet drivers and truck. 772½ square feet tube (except 102, which is 858½ square feet,) 80⅔ do. firebox, and 15½ do. of grate surface. Weight averages 57,500 lbs., of which 37,400 lbs. are on drivers. Steam used at one revolution 10.508 cubic feet. Nos. 106 to 111 inclusive, by same builders, are the same as above, only having 5 feet drivers and 72⅔ square feet of firebox surface.

Nos. 113 and 114, by Taunton Company; inside connections, cylinders 17 by 20 inches, four 5 feet drivers and truck. 939 square feet tube, 90 do. firebox and 16⅛ do. of grate surface. Weight 59,450 lbs., of which 38,510 lbs. are on the drivers.

Nos. 115, 116, 117, and 118, by Taunton Company, have 18 inch cylinders and 20 inch stroke; four five feet drivers and truck. 857½ square feet

tube surface. Furnace and grate area same as 113. Weight 58,060 lbs., of which 37,570 lbs. are on drivers. Steam used at one revolution 11.781 cubic feet.

Nos. 119 to 124 inclusive; extreme outside connections, by Boston Locomotive Works. 16 inch cylinders, 26 inch stroke, four 5 feet drivers and truck, 792 square feet tube, 82⅛ do. firebox and 15¾ do. of grate surface. Weight 52,675 lbs., of which 31,775 lbs. are on drivers. Steam used at one revolution 12.101 cubic feet.

Nos. 125 and 126, by Amoskeag Manufacturing Company. Inside cylinders, 18 inches dia. and 20 inch stroke. Six 4½ feet drivers without truck. 893½ square feet tube, 74¾ do. firebox and 15 do. grate surface. Weight 48,235 lbs., of which 21,410 lbs. are on front, 14,385 lbs. on middle, and 12,440 lbs. on back drivers. Steam used at one revolution 11.781 cubic feet. No. 126 has since been altered to an eight wheeled engine.

Nos. 127 to 132 inclusive; inside connections, by Boston Locomotive Works. Cylinders 17 by 20 inches, four 5½ feet drivers and truck. 871¼ square feet of tube surface. Weight 54,400 lbs., of which 34,950 lbs. are on drivers. Steam used at one revolution 10.508 cubic feet.

Nos. 133, 134 and 135, extreme outside connections, by New Jersey Locomotive and Machine Company. Cylinders 16 by 20 inches; four 5 feet drivers and truck. 670¼ square feet tube, 54¼ do. firebox and 12⅜ do. of grate surface. Weight not given. Steam used at one revolution 9.308 cubic feet.

Nos. 136, 137, 138 and 141, by same builders, same as Nos. 72 to 83 inclusive, by Swinburne, Smith & Co.

Nos. 139 and 140, generally the same as Nos. 72 to 83, except 1,072½ square feet tube, 82¼ do. firebox and 16 ½do. of grate surface.

Nos. 142 and 143, inside connections, by Essex Company. Cylinders 17 by 20 inches; four 4½ feet drivers and truck. Boilers 49 inches in diameter, containing 190 1 7-8 inch tubes, 11 feet long. 1,025⅞ square feet of tube, 76⅔ do. firebox and 16 do. of grate surface. Weight 58,250 lbs., of which 36,450 lbs., are on drivers. Steam at one revolution 10.508 cubic feet.

We have thus given a very full statement of the motive power of the leading broad gauge road in this country, the one which is the longest continuous road in the world. We find there are 8 engines, only, having cylinders of less than 15 inches diameter; 10 with cylinders over 15 and less than 16 inches; 20 of 16 inches; 91 of 17 inches; 11 of 18 inches, and 2 of 19 inches.

10 engines have drivers of less that 4 feet 6 in. diameter; 28 have drivers of 4 feet 6 inches; 65 with 5 feet drivers; 18 with 5 feet 6 inches; 24 of six feet, and 2 of 7 feet drivers.

We see that the weight of the passenger engines is generally 28 tons, and that of the freight engines, generally from 29 to 32½ tons. The passenger engines have from 8,000 to 9,500 lbs, on a single driver, the freight engines from 8,000 to 11,250 lbs.

The Erie road have now under contract for immediate delivery a large number of freight engines, 28 as we are informed, of extraordinary weight and power. They will be inside connected engines, having 18 inch cylinders, 20 inch stroke, four 5 feet drivers and truck. The boilers will be of 48 inches in diameter and will contain 197 tubes, 2 inches in diameter and 10 feet 9 inches long. The furnace grate will be 48 inches by 57 inches, giving 19 square feet of grate surface. These engines must weigh fully 31 tons, of which 21 or 22 tons must be on but four drivers, giving from 10,500 to 11,000 lbs. on a single point.

The transportation effected by such heavy equipments must be compared with that of narrow gauge roads, when we shall find that generally the length and load of the Erie freight and passenger trains do not exceed those of the trains upon the narrow track. Frequent observation upon the line of the road shows this, while the average tonnage per train is shown by the State Engineer's Reports to be about the same upon the Erie as upon the Northern, the Central, and other roads.

In June, 1852, the Northern railroad of New York had 28 engines, the heaviest of which weighed 26 1-5 tons, when in full running order. Of this weight 17 1-10 tons were upon the drivers. The cylinders were of 15 inches diameter and 24 inch stroke; the drivers two pairs of 4½ feet diameter. The freight engines were *generally* of 22½ tons weight, having 16 by 20 inch cylinders with two pairs of 4 1-2 feet drivers each.

The passenger engines has mostly 15 by 18 inch cylinders, with 5 to 5 1-2 feet drivers, and weighed from 20 1-2 to 24 9-10 tons.

The Boston and Maine railroad, in Massachusetts, operating a heavy freight over 40 to 45 feet grades, employs no engines of over 24 tons weigbt. The heaviest freight engines have 16 by 20 inch cylinders, three pairs of 46 inch drivers and a truck. The usual load for such an engine, on 40 feet grades, is from 20 to 28 eight wheeled cars with usual freight. 61 cars of four wheels each, weighing with freight 391 tons, have been taken up a 47 feet grade and through a bad reversed curve, in the winter time, by one of the above described engines. This was an ordinary train and was by no means employed as a *test*. The usual pattern of freight engine upon this road has 15 by 20 inch cylinders, two pairs of 4 1-2 feet drivers and a truck; weight 44,400 lbs., of which 30,810 lbs. are on drivers. Steam used at one revolution, 8,181 cubic feet.

On the Fitchburg railroad, the heaviest engines are the same as upon the Boston and Maine railroad.

On the Western railroad, of Massachusetts, the freight engines have generally 16 by 20 inch cylinders, and four 4 1-2 ft. drivers and truck. The diameter of boiler is 42 inches, the length of tube 10 1-2 feet, and the whole weight about 23 tons. The Western road is the great avenue for western freight going to Boston. The grades of this road ase in some places 80 feet per mile.

The Baltimore and Ohio road, working the most severe grades in the country, has freight engines of nearly equal weight with those upon the Erie road. But the transportation accomplished upon the two roads, by engines of nearly equal weight, is much in favor of the narrow gauge.

The Erie road has no grades to compare with those of the Baltimore and Ohio road, nor no great through traffic like that of the Reading road, and its motive power cannot be admitted to a comparason with that of those, and similar roads, with exceptional grades or regular maximum trains. It must therefore be referred to a comparason with the ordinary traffic of roads of equal grades and doing a general business. Whenever such comparason is made it is found that the broad gauge has much the heaviest equipment for the same business, the amount of increase of weight being almost exactly proportional with the increased width of its track.

Virginia Central Railroad.

The Staunton Spectator has received, in advance, the President's Report to the Eighteenth Annual Meeting of the Stockholders of the Virginia Central Railroad Company, from which we gather the following—

The report urges the policy of pushing the work to an early completion, and for this purpose recommends an application to the Legislature for a sufficient increase of capital stock, and also for a loan, on mortgage, lest the money might not be speedily raised by subscription.

The President urges the construction of a short line from Charlottesville to Richmond, on good reasons both of expediency and necessity. A double track on this end of the road will soon be indispensable, and the advantage is shown on the score of economy in cost and distance by making this second track on the shortest line, by which a saving of 25 or 30 miles can be effected. The old line by Gordonsville will, it is argued, be profitable still as a branch road.

The road is relaid with a heavy rail from Gordonsville to the Junction, and the report recommends the early substitution of the heavy rail throughout the line. The work shops of the Company have been removed to Richmond.

The receipts of the last year, ending the 30th of September, amount to $210,052 11, an excess of $33,306 17 over the previous year, while the expenses have not increased in the same ratio.—This gratifying addition to the revenues has occurred without any material extension of the road, having been advanced only 3 miles in the year.

The Board recently declared a dividend of 10 per cent, on that part of the stock created by the acts of 1836-'38-'47 '48 and '51, that being the stock expended on the part of the road now in use.

Indiana and [illegible] Railway.

The Directors of this company have been in session in this city for some days, and, as we understand, adjourned yesterday. A large amount of important business was before them, and was disposed of with entire harmony and unanimity. Full reports of the previous operations were submitted to the Board.

Upon comparing the books, the amount of local subscriptions were found to be $819,0 0 And the directors from every portion of the line expressed the strongest assurances that the stock would be increased largely and liberally.

The entire work has been let to M. C. Story & Co., of New York, at $22,000 per mile, to be completed by the 1st December, 1855.

A portion of the contractors were present during the meeting and announced their readiness to break ground so soon as a sufficient portion of the route could be located. The whole plan for the prosecution of the work was discussed and agreed on with entire unanimity. The Board and contractors agreed on a vigorous and systematic prosecution with a view to its speedy completion. A corps of engineers is now surveying westwardly from the Wabash, and another party will start from that point eastwardly so soon as it can be organized.

From the vigor and zeal displayed by the company and the contractors, no further doubts can be entertained that the road will be pushed to completion at the earliest period; and when completed, we have heard but one opinion expressed, as to its value and importance. Traversing as it does, the very best portions of Indiana and Illinois, connecting the capitals of two great States

of the West, by a direct East and West line, it cannot fail, when completed, to command an immense business, and its stock must be equal to that of any road in the West.—*Indiana Sentinel.*

American Railroad Journal.

Saturday, November 26, 1853.

Share and Money Market.

The favorable change in monetary affairs continues. The improvement has been as rapid as was the opposite tendency a short time since. The stringency, no doubt, was aggravated by the action of the banks, which, though salutary on the whole, could not fail of being productive of a good deal of distress, The curtailment in their *loans*, and the increase in the amount of *specie*, have placed the banks in a very strong condition, which will enable them to assist the upward tendency. The experience of the few months past will not be without its influence, proving, as it has, the general soundness of commercial affairs, and of the financial condition of railroad companies. The earnings of our railroads never presented so flattering a result as] at the present time.

The stock market has shown a very decided advance as will be seen by our tables. The improvement of many of the leading stocks from the lowest point of the recent depression, has been from ten to twelve per cent. The tendency still appears to be steadily upward. Money is abundant on call, and is daily becoming easier on time contracts.

The Bank Statement for the week ending Nov. 19, was as follows:

	Nov. 19.	Nov. 12.
Loans	$83,717;662	$82,882,409
Specie	13,691,324	12,823,575
Circulation	9,151,443	9,287,629
Deposits	57,446,424	56,201,107

Covington and Lexington Railroad.

The line of this road is completed forty-seven miles from Covington, and is making rapid progress toward Lexington. It has already reached a section of country capable of furnishing a lucrative traffic, and up to this point, the road will find active and profitable employment, whichand will be largely increased as the road progresses.

Though the cost of the above road has been somewhat greater than that of most of the new lines in the west, this fact is more than compensated for by the superiority, in a commercial point of view, of the route it occupies. It will connect the "garden of Kentucky" with the great city of the Ohio valley, and will form the *base* of numerous *branch* roads radiating from it at Lexington, and other points in its line. The tendency of the Kentucky trade, north and east, becomes stronger every year, and the opening of the roads now in progress from the interior portions of the state, to the Ohio river, will complete the revolution now going on. Cincinnati will then become the principal local market for Central Kentucky, for the trade of which, the above road must form the chief medium of communication. We know of no road in the country having the prospect of a better business, and which can neither be accommodated, nor drawn off, by other roads. The above road is being pushed rapidly forward, notwithstanding the recent severe pressure in the money market, and is too far advanced toward comple-

Railway Share List,

Compiled from the latest returns—corrected every Wednesday—on a par valuation of $100.

NAME OF COMPANY.		Miles open.	Capital paid in.	Funded debt.	Tot. cost of road and equipm't.	Gross Earnings for last official year.	Net Earnings for last official yr.	Dividend for do.	Price of Shares.
Atlantic and St. Lawrence..	Maine.	150	1,538,100	2,978,700	5,150,278	254,743	113,520	none	80
Androscoggin and Kennebec..	"	55	809,878	1,016,500	2,064,458	140,561	80,053	none	30
Kennebec and Portland.....	"	72	952,621	297,80	2,514,067	168,114	100,552	none	41
Port., Saco and Portsmouth..	"	51	1,355,500	123,884	1,459,384	208,669	.....	6	99½
York and Cumberland,.....	"	20	285,747	341,100	713,605	23,946	11,256	none	24
Boston, Concord and Montreal.	N. H.	93	1,649,278	622,200	2,540,217	150,538	79,659	none	35
Concord	"	35	1,485,000	none.	1,485,000	305,805	141,836	8	104½
Cheshire	"	54	2,078,625	720,900	3,002,094	287,768	55,266	5	48
Northern	"	82	3,016,634	.....	.....	328,782	163,075	5	47½
Manchester and Lawrence....	"	24	717,543	.....	.....	.....	.....	6½	88
Nashua and Lowell.....	"	15	600,000	none.	651,214	132,545	51,513	8	109
Portsmouth and Concord....	"	47	.....	.....	1,400,000	.....	.....	none	....
Sullivan.....	"	26	.....	.....	673,500	.....	.....	none	21
Connecticut and Passumpsic..	Vt.	61	1,097,600	550,000	1,745,516	.....	.....	none	37
Rutland	"	120	2,486,000	2,429,100	5,577,467	495,397	266,539	none	25
Vermont Central.....	"	117	8,500,000	3,500,000	12,000,000	.....	.....	....	13⅝
Vermont and Canada.....	"	47	1,500,000	.....	1,500,000	Leased to	the Vt. C	ent.	100
Western Vermont.....	"	51	392,000	700,000	.....	Recently	opened.	none	....
Vermont Valley	"	24	.....	.....	.....	.....	.....	none	....
Boston and Lowell.....	Mass.	28	1,830,000	.....	1,995,249	388,108	130,881	7½	92½
Boston and Maine.....	"	83	4,076,974	150,000	4,092,927	659,001	338,215	7	103¾
Boston and Providence.....	"	53	3,160,390	390,000	3,546,214	469,656	227,434	6	87½
Boston and Worcester.....	"	69	4,500,000	425,000	4,845,967	758,819	331,296	7	101¾
Cape Cod branch.....	"	28	421,295	171,800	633,906	60,743	30,056	2½	45
Connecticut River.....	"	52	1,591,100	193,500	1,801,946	229,004	72,028	5	55
Eastern.....	"	75	2,850,000	500,000	3,120,391	488,793	241,017	7½	91½
Fall River.....	"	42	1,050,000	none.	1,050,000	229,445	99,589	8	106½
Fitchburg.....	"	66	3,540,000	112,305	3,623,073	574,574	232,787	6	93½
New Bedford and Taunton...	"	20	500,000	none.	520,475	164,230	43,950	7½	117
Norfolk County.....	"	26	547,015	819,743	1,245,927	67,251	23,415	none	60
Old Colony.....	"	45	1,964,070	282,300	2,293,534	322,213	101,510	none	90½
Taunton Branch.....	"	12	250,000	none.	307,136	137,406	24,399	8	....
Vermont and Massachusetts..	"	77	2,140,536	1,001,500	3,203,333	218,679	18,648	none	13¾
Worcester and Nashua.....	"	45	1,134,000	171,210	1,321,945	162,109	66,900	4½	59½
Western	"	155	5,150,000	5,319,520	9,953,759	1,339,873	683,194	6½	9⅛8
Stonington.....	R. I.	50	.....	467,700	.....	240,572	110,892	....	61
Providence and Worcester...	"	40	1,457,500	300,000	1,731,498	253,690	139,514	6	....
Canal.....	Conn.	45	922,500	500,000	1,400,000	.....	.....	4	65
Hartford and New Haven....	"	72	2,350,000	800,000	3,150,000	639,529	294,269	10	118½
Housatonic.....	"	110	.....	.....	2,500,000	329,041	168,902	none	....
Hartford, Prov. and Fishkill..	"	50	.....	.....	In progres	69,629	.....	none	....
New London, Wil. and Palmer	"	66	558,861	800,000	1,511,111	114,410	.....	.....	....
New York and New Haven...	"	61	3,000,000	1,641,000	4,978,487	806,713	428,173	7	101
Naugatuck	"	62	926,000	440,000	.....	.....	.....	8	....
New London and New Haven.	"	55	750,500	650,000	1,380,610	Recently	opened.	none	52
Norwich and Worcester.....	"	54	2,121,110	701,600	2,596,488	267,561	116,965	4½	55
Buffalo and New York City..	N. Y.	91	900,000	1,550,000	2,550,500	Recently	opened.	none	85
Buffalo, Corning and N. York.	"	132	.....	.....	In progres	.....	.....	none	65
Buffalo and State Line.....	"	69	879,636	872,000	1,921,270	Recently	opened.	....	130
Canandaigua and Niagara F..	"	50	.....	.....	In progres	.....	.....	.....	....
Canandaigua and Elmira.....	"	47	425,509	582,400	987,627	76,760	39,360	none	68
Cayuga and Susquehanna....	"	35	687,000	400,000	1,070,786	74,241	23,496	none	....
Erie, (New York and Erie)...	"	464	9,612,995	24,003,865	31,301,806	3,537,766	1,691,623	7	7⅛9
Hudson River.....	"	144	3,740,515	7,046,395	10,527,654	1,063,659	338,783	none	65¾
Harlem	"	130	4,725,250	977,463	6,102,935	681,445	324,494	5	56
Long Island.....	"	95	1,875,148	516,246	2,446,391	205,068	44,070	none	31½
New York Central	"	504	22,858,600	2,111,824	24,974,423	.....	.....	....	113
Ogdensburgh (Northern).....	"	118	1,579,969	2,969,760	5,133,834	480,137	195,847	none	28
Oswego and Syracuse.....	"	35	350,000	201,500	607,803	90,616	43,609	4	70
Plattsburg and Montreal....	"	23	174,042	131,000	349,775	Recently	opened.	none	....
Rensselaer and Saratoga....	"	25	610,000	25,000	774,495	213,078	96,737	....	....
Rutland and Washington.....	"	60	850,000	400,000	1,250,000	Recently	opened.	....	....
Saratoga and Washington....	"	41	899,800	940,000	1,832,945	173,545	135,017	none	30
Troy and Rutland.....	"	32	237,690	100,000	329,577	Recently	opened.	....	33
Troy and Boston.....	"	39	480,936	700,000	1,043,357	Recently	opened.	none	....
Watertown and Rome.....	"	96	1,011,940	650,000	1,693,711	225,152	116,706	8	100
Camden and Amboy.....	N. J.	65	1,500,000	.....	4,327,492	1,388,385	478,413	10	145
Morris and Essex.....	"	45	1,022,420	128,000	1,220,325	149,941	79,252	4	....
New Jersey.....	"	31	2,197,840	476,000	3,245,720	603,942	316,259	10	131
New Jersey Central.....	"	63	986,106	1,500,000	2,379,880	260,899	124,740	3⅛	....
Cumberland Valley.....	Penn.	56	1,184,500	13,000	1,265,143	118,617	76,890	5	....
Erie and North East.....	"	20	600,000	.....	750,000	Recently	opened.	....	125
Harrisburgh and Lancaster...	"	36	830,100	713,227	1,702,523	265,827	106,320	8	....
Philadelphia and Reading....	"	95	6,656,382	10,427,800	17,141,987	2,480,626	1,251,987	7	88
Philad., Wilmington and Balt.	"	98	3,850,000	2,403,276	6,813,839	667,785	383,501	5	76

Railway Share List,

Compiled from the latest returns—corrected every Wednesday—on a par valuation of $100.

NAME OF COMPANY.		Miles open.	Capital paid in.	Funded debt.	Tot. cost of road and equipm't.	Gross Earnings for last official year.	Net earnings for last official yr.	Dividend for do.	Price of shares.
Pennsylvania Central	Penn.	250	9,768,155	5,000,000	13,600,000	1,943,827	617,625	....	95
Philadelphia and Trenton	"	30	....	....	....	....	....	....	....
Pennsylvania Coal Co	"	47	....	....	....	....	....	....	102¼
Baltimore and Ohio	Md.	381	9,188,300	9,827,123	19,542,307	1,325,563	615,384	7	56¼
Washington branch	"	38	1,650,000	....	1,650,000	348,622	216,287	8	....
Baltimore and Susquehanna	"	57	....	....	....	413,673	152,536	....	..
Alexandria and Orange	Va.	65	....	....	In prog.	....	....	....	....
Manassas Gap	"	27	....	....	In prog.	....	....	....	....
Petersburgh	"	64	769,000	173,867	1,163,928	227,593	72,370	7	77
Richmond and Danville	"	73	1,372,324	200,000	In prog.	....	....	....	70
Richmond and Petersburgh	"	22	685,000	....	1,100,000	122,861	74,113	none	40
Rich., Fred. and Potomac	"	76	1,000,000	503,006	1,531,238	254,376	113,256	7	100
South Side	"	62	1,357,778	640,000	2,106,467	62,762	....	....	....
Virginia Central	"	107	1,400,100	446,036	In prog.	176,485	74,902	none	61
Virginia and Tennessee	"	60	3,000,000	1,500,000	In prog.	....	....	none	98
Winchester and Potomac	"	32	180,000	120,000	416,532	89,776	....	12	....
Wilmington and Raleigh	N.C.	161	1,338,878	1,134,698	2,965,574	510,038	153,898	6	....
Charlotte and South Carolina	S. C.	110	....	....	....	....	....	....	....
Greenville and Columbia	"	140	1,004,231	300,000	In prog.	....	....	....	....
South Carolina	"	242	3,858,840	3,000,000	7,002,396	1,000,717	609,711	7	125
Wilmington and Manchester	"	....	....	....	In prog.	....	....	....	....
Georgia Central	Ga.	191	3,100,000	306,187	3,378,132	945,508	508,625	8	115
Georgia	"	211	4,000,000	1,214	....	934,424	456,468	7½	....
Macon and Western	"	101	1,214,283	168,000	1,596,283	296,584	153,697	9	109
Muscogee	"	71	....	....	In prog.	....	....	....	....
South Western	"	50	586,887	150,000	743,525	129,395	71,535	8	....
Alabama and Tennessee River	Ala.	55	....	....	In prog.	....	....	....	....
Memphis and Charleston	"	93	776,259	400,000	In prog.	....	....	....	....
Mobile and Ohio	"	33	879,868	....	In prog.	....	....	....	....
Montgomery and West Point	"	88	688,611	....	1,330,960	173,542	76,079	8	....
Southern	Miss.	60	....	....	....	....	....	....	....
East Tennessee and Georgia	Tenn.	80	835,000	541,000	In prog.	....	....	....	....
Nashville and Chattanooga	"	125	2,093,814	850,000	In prog.	....	....	....	....
Covington and Lexington	Ky.	38	1,430,150	900,000	In prog.	....	....	....	62½
Frankfort and Lexington	"	29	357,218	....	584,902	87,421	44,250	....	80
Louisville and Frankfort	"	65	....	....	....	....	....	....	....
Maysville and Lexington	"	....	....	....	In prog.	....	....	....	....
Cleveland and Pittsburgh	Ohio.	100	1,239,450	1,371,000	2,963,756	194,429	123,306	6	93
Cleveland, and Erie	"	95	....	....	....	....	....	....	....
Cleveland and Columbus	"	135	3,027,000	408,200	3,655,000	777,793	488,454	12	122
Columbus, Piqua and Indiana	"	46	....	....	2,000,000	....	....	....	80
Columbus and Lake Erie	"	61	....	....	....	....	....	....	....
Cincinnati., Ham. and Dayton	"	60	2,100,000	500,000	2,659,653	321,793	200,967	....	102½
Cincinnati and Marietta	"	....	....	....	In prog.	....	....	....	72½
Dayton and Western	"	40	310,000	550,000	925,000	Recently	opened.	....	80
Dayton and Michigan	"	20	....	....	In prog.	....	....	....	....
Eaton and Hamilton	"	36	....	....	....	....	....	....	60
Greenville and Miami	"	31	....	....	....	....	....	....	....
Hillsboro	"	37	....	....	In prog.	....	....	....	....
Little Miami	"	84	2,370,784	....	2,634,157	526,746	314,670	10	113
Mansfield and Sandusky	"	....	900,000	1,000,000	1,855,000	....	....	....	....
Mad River and Lake Erie	"	167	2,387,200	1,767,000	4,110,148	540,518	113,401	....	95
Ohio Central	"	57	....	....	In prog.	....	....	....	90
Ohio and Mississippi	"	....	....	....	"	....	....	....	87
Ohio and Pennsylvania	"	187	1,750,700	2,450,000	....	Recently	opened.	....	....
Ohio and Indiana	"	....	....	....	In prog.	....	....	....	....
Scioto and Hocking Valley	"	....	....	....	"	....	....	....	....
Toledo, Norwalk and Clevel'd	"	87	552,000	800,000	1,317,140	Recently	opened.	....	..
Xenia and Columbus	"	54	1,092,137	119,500	1,257,714	237,506	135,363	15	116
Evansville and Illinois	Ind.	31	....	....	In prog.	....	....	....	....
Indiana Central	"	....	....	....	"	....	....	....	80
Indiana Northern	"	131	....	....	"	Recently	opened.	....	115
Indianapolis and Bellefontaine	"	83	....	....	"	....	....	....	166
Lawrenceburg and Ind	"	90	....	....	In prog.	....	....	....	05
Lafayette and Indianapolis	"	62	....	....	....	Recently	opened.	....	82
Madison and Indianapolis	"	88	1,650,000	750,000	2,400,000	516,414	268,075	10	78
Peru and Indianapolis	"	40	....	....	In prog.	....	....	....	65
Terre Haute and Indianapolis	"	72	632,387	668,100	1,353,019	105,944	71,446	4	108
Rock Island and Chicago	Ill.	....	....	....	....	....	....	....	....
Chicago and Mississippi	"	185	2,400,000	4,000,000	4,600,000	....	....	....	....
Illinois Central	"	....	....	....	....	....	....	....	136
Galena and Chicago	"	92	1,932,361	500,000	In prog.	473,548	286,152	....	100
Michigan Southern	Mich.	315	2,499,410	2,629,000	6,430,246	592,187	293,046	....	120
Michigan Central	"	282	4,000,000	4,067,396	8,614,193	....	....	8	109
Pacific	Mo.	38	1,000,000	none.	In progres	Recently	opened.	....	....

tion to suffer to any considerable extent from an adverse state of the times.

Earnings of Railroads.

The large, and rapidly increasing, earnings of railroads, is a most gratifying feature in the times. In the aggregate, they are doing much better than was expected, or claimed by parties most interested in presenting favorable estimates. This fact cannot fail to exert a beneficial influence upon public sentiment in reference to the safety of our roads as investments of capital. The larger proportion of earnings being from *freight*, proves an abundant supply of the right kind of *material* for a lucrative business, and is a good proof of the wealth and prosperity of the country. The success of our roads shows that our people have not been acting upon an unsound hypothesis in reference to their uses and value. It serves as a "healing act" upon the means employed. The roads, proving good investments, will relieve the various municipal corporations that have in one way or another become connected with them, of their liabilities, by enabling the companies to assume them, as they have contracted to do, in most cases. The proceeds of state, county and city, bonds, having been well invested, the above bodies reap a double advantage, a remunerative return upon the investments, and the vastly greater incidental benefits, to secure which was the moving cause that led them to encourage railroad enterprises. The extraordinary stimulus communicated to the business of the whole, shows the value of our railroads in a still wider scale. The nation at large would have been sufficiently compensated for their construction, should the value of the stocks and securities have proved comparatively worthless. That this advantage has been realized, with a good profit upon the cost of our roads, should be a matter of general congratulation.

Montreal Screw Steamship Company.

It is with pleasure we learn that the first vessels for this Company, of which Messrs. Edmonstone, Allan & Co., are the Agents, have been contracted for, and are now building in the Clyde. They are of 1875 tons, new register measurement, and will be fitted up with engines of 350 horse power, which are guaranteed to propel the vessels ten knots an hour, and enable them to make the passage from Liverpool to Quebec in a period not exceeding twelve days.

The first vessel is to be completed by the 1st June next; and will be put into the trade immediately thereafter. The others will follow in quick succession. Arrangements are also in progress to put a similar vessel into the trade from London to Montreal. When these vessels are ready, the merchants of this Province will have nothing to envy in the steamers trading to the United States, either for speed, safety or accommodation.

Messrs. Edmonstone, Allan & Co., are also making the following additions to their line of sailing vessels. A splendid Iron Clipper Ship of 850 tons register, building by Messrs. John Reid & Co., of Port Glasgow, and a wooden one of similar dimensions under construction by Messrs. Robert Steele & Co., of Greenock, the celebrated builders of the Cunard Steamers. These ships will take their places in the line early next spring.—*Transcript.*

In addition, we hear from Quebec, that Messrs. Gilmour & Co. are also about to enter extensively in the trade; intending to build not less than seven ocean steamships of about 2,000 tons each, to form lines of packets between Quebec and Liverpool, Glasgow, and London.

Railroad to the Pacific.

In considering the subject of a railroad to the Pacific, we are saved the discussion of its necessity to accommodate the wants of commerce and travel, or its probable value as an investment of capital. The sentiment of the country is fully agreed upon these points. Were there any doubt or difference of opinion, in reference to them, the importance of the road, in a *political* point of view, would at once secure an unanimous voice in its favor. It *must* be built, and speedily, is the opinion, and we may say the *conviction* of all parties. The only question remaining is the *modus operandi*. This appears a formidable one only on account of want of knowledge as to the proper route and method. But we shall not long remain in ignorance even upon *these* points. In reference tc the former, every person in the United States who possesses any information upon the subject has taken the stand, and is giving in *his* testimony. The public will soon be in possession of the evidence, and will be busy at work collating and comparing the different statements and reports with each other, in sifting the true from the fictitious, until a tolerably digested body of evidence be presented. In the mean time, further explorations, carried on both by government and individuals, and guided by a more definite object and better plans, are adding rapidly to the stock of information already possessed; so that we are really making rapid progress without any apparent movement. So too, with the question of *ways and means*. We are satisfied that the practicability of accomplishing this work by private capital, assisted only by grants of land, and mail contracts, is *first* to be demonstrated, before the general government will aid it by direct appropriations of *money*. Such undoubtedly will be the policy of the Administration, and which, we have no doubt, it will be sustained by the sentiment of the country. We do not see how it would be possible for government to undertake this work without being swindled out of a greater part of the money. We doubt whether Congress would allow the road to be entrusted to competent and faithful hands. Too many members would wish to be interested in the *job* to allow it to go out of their hands. Congress too, would not agree, probably, upon any *one* route, which will be an additional reason for withholding aid. The conviction of the country is, we think, strongly against any responsible connection of the general government with the matter, and this is probably the principal reason why so few prominent men take the ground that the road is to be a government work. Mr. Benton's plan takes the affirmative side of this proposition, but we believe the reason of his difference from the general voice of the country, is the utter impossibility of constructing the road upon *his* route, by private means. Hence he naturally assumes the proposition that the road should be constructed, and owned by the United States, as every other would at the present time be fatal to *his* project. At any rate such is our view of the case.

We do not regard the construction of a railroad to the Pacific as beyond the well directed efforts of a private company, aided it would be by liberal grants of lands. Properly managed it is a work which would command the co-operation of capital throughout the world. It would be a work, the influences of which would reach far beyond the boundaries of this country. Sustained by such an universal sense of its necessity and value, its construction would certainly not prove an insuperable ten years task for a nation that is constructing more than twice its length of line each year!

The first and great question to be solved is that *route*, which should be made a matter of *evidence*, simply. This disposed of, that of *means* would not long occupy the public mind. Towards determining the first, should the entire energies both of the government and the people be directed. We hope and believe that the former will immediately place a number of parties in the field, sufficient to give us the physical features of the country traversed by the proposed routes with the least possible delay.

Lexington and Big Sandy Railroad.

We have received the report of Professor W. W. Mather upon the Geology of the country intersected by the route of the above road. The report states that this country abounds in mineral resources available for profit to the owners, for profitable transportation by the railroad company, and for supplying the wants of the country along the line of the road. The line traverses a rich agricultural country from Lexington to the Licking river, where it enters the mineral region. The mineral materials available along the road, and easy of access, are coal, both common bituminous and cannel—iron ore in numerous workable beds of great extent and good working qualities—building-stones and freestone of the very best qualities, in inexhaustible quantities, where quarries can be opened directly along the railroad—limestone of various qualities, adapted for making white lime and hydraulic cement. Fire clay and fire stone are also abundant in the coal region.

The following table shows the order of superposition of the principal masses of the rock formations, strongly marked as distinct in theis general characters, and each gives its distinct topographical as well as its agricultural character to the country occupied by it.

Coal formation.	Containing common and cannel coals, and numerous workable and some worked seams of iron ore.
Carboniferous limestone.	Called the white limestone, and covered by a seam of workable and worked iron ore.
Fine grained sandstone.	The same as the Waverly sandstone of Ohio, so much worked in Ohio as a fine building stone.
Black slate.	The source of many mineral springs.
Buff colored limestone.	Contains cement rock, and some beds of iron ore.

Blue limestone.

The Blue limestone region is eminently the agricultural region of Kentucky. It occupies the country along the line of the railroad from Lexington through Mount Sterling to near Owensville.

The Slate furnace ore bed is an enormous bed of iron ore, intersected by the line of the road. It is described as an oolitic limonite, lying on the buff limestone, and occupying fifty acres or more and where the road crosses it is fifty feet in thickness. The ore from this bed if mixed with other ores may be made, it is believed, to produce good iron.

The fine grained sandstone forms the body of the hills along the railroad line from the mouth of Triplett's creek to near its source. Its thickness is 300 to 400 feet. This rock is deemed very important to the road and is destined to furnish a large amount of freight. It is the same quality of rock that is quarried for the Cincinnati, Columbus, and other markets in Ohio, at Waverly on the Ohio canal, and at the quarries below Portsmouth. Quarries can be opened directly alongside of the railroad, inexhaustible in quantity, in many places from near the mouth to near the source of Triplett's creek, a distance of 16 or 18 miles.

The Carboniferous limestone appears at several points on the located line, and is important as a source of inexhaustible quantities of white lime—as a flux for iron ores—as a building stone and as a floor on which almost everywhere a bed of iron ore of workable thickness and superior quality is found wherever there is a few feet of earth to cover it. The iron over this lime stone has been examined in several places and found to be of superior quality. It is called limestone ore and is generally from 8 to 18 inches thick.

Many distinct beds of coal are found over many miles, along and on both sides of the railroad line. Coal beds deemed worthy of extensive working, to supply the wants of the country to the west along the line of the road and thence to Frankfort and towards Louisville, exist on the waters of the Little and East Forks of Little Sandy, and on the waters of Big Sandy. They are also destined to be used extensively for the manufacture of iron with stone coal.

Cannel coal of good quality is also found in several places.

The bituminous coal formations are large and widely distributed. Of these Professor Mather estimates 5000 tons of coal accessible per mile on the land within a mile of the road or 3,000,000 tons per square mile for 20 miles on each side of the road or one hundred and twenty million of tons. This, if demanded by a steady and reliable market, would afford transportation for 600,000 tons per year for 200 years, from within a single mile of the road. The country for miles in width on each side of the road is equally well provided with coal, so that the resources of the country along the railroad line in Greenup and Carter counties may be considered inexhaustible, and will furnish all needed supplies of this useful fuel for ages of time, to all the country bordering on the line of the road. The expenses and risks of river transportation have prevented bringing this coal into extensive use in Lexington and other points west.

The expense of this coal delivered at points 100 miles distant from the mines, including value of coal in ground, all charges of mining, moving, &c., is estimated by Professor Mather at $2 33 per ton.

The iron ores abound on the route of the railroad from the head of Triplett's creek to the mouth of Big Sandy, but are most abundant between the Little and Big Sandy. There is probably no region of equal extent, says Professor Mather, supplied with a greater quantity, or with more varied qualities of good, easy working iron ores. The iron formations, like those of coal, already noticed, are numerous and widely distributed, besides being generally accessible to the line of the road.

Professor Mather's estimate of the extent of the

deposits of iron is that of 500 tons per acre, which for 800 square miles of land along the railroad, adapted for furnaces, would give a capacity of production of two hundred and fifty six millions of tons of iron.

From the details given it is inferred that the resources of the country on the railroad line are inexhaustible, and the construction of the railroad will lead to a development of those resources and afford much transportation and give rise to much business.

Many matters of minor importance have been passed by in the consideration of the principal resources of the country.

White sandstone for glass, fire clay for fire bricks, stones adapted for whetstones and grind stones are widely diffused along the route. The products of the forest such as lumber, bark, cooperage stuff, &c., are also important and will swell the freight seeking a market through this road.

From these facts, disclosed by the survey of so skilfull a geologist as Professor Mather, there appears no room for doubt that the resources of the country, intersected by the route of the Lexington and Big Sandy railroad, are of the most ample and valuable character; that the value of that section, as it becomes known, will appreciate largely, and that the avenue of communication afforded by the proposed road will be occupied to its full capacity by the business, of which the elements already existing need only to be developed by its construction.

Indiana Central Railroad.

We had the pleasure a few days since, of passing over the Indiana Central Railroad, then only recently opened. There are few routes in the West better calculated to impress the traveller favorably than the one occupied by this work. Following immediately upon the line of the *natural* road, it traverses the *best* improved portion of the State, presenting an appearance of culture and wealth, uncommon in any portion of the West. In fertility of soil, that portion of Indiana traversed by the above road, is not exceeded by any part of the country that we have ever seen. The road is well built, pursues very nearly a *direct* course, has abundant sources of a large *local*, and is remarkable well situated to command a large *through* business. Already is its traffic fully up to the capacity of a large equipment, and will be rapidly increased by the development of the country upon the line of the road, and the progress of similar works on other parts of the State.

Very few roads make a better show of business in the outset, than above. By all parties acquainted withe the line, we found it regarded as one of the best for business, in the State. Such was our opinion from what we saw.

The road occupies an easy route, with the exception of the crossing of the *White-water* River, which required a very long *hill*, with equally long and expansive *cuts*. The work at this point delayed the opening of the road a long time beyond the expectations of the Company. The Whitewater Valley is depressed very curved ovally below the general surface of the surrounding country, rendering, either very steep gradients, or deep cuts and high embankments, unavoidable by all roads crossing it at right angles.

Tee Central road was opened about the 10th ult. in season for the heavy fall business, which is fully up to the expectations of the Company.

Cleveland and Toledo Railroad Company.

It will be remembered that the Journal of the 12th inst. contained the circular statement of the affairs of this Company, and the condition and cost, of the work, &c., on both lines of the road, with an estimate of the fall revenues. The facts represented were, briefly, as follows: The Toledo Norwalk and Cleveland, and the Junction railroad companies united their interests under the name of the Cleveland and Toledo Railroad Company; the former being known as the Southern, and the latter as the Northern, line of the Company's road. The southern line has been in successful operation some months; the Northern line is recently opened from Ohio City to Sandusky City, where it connects with the Mad River Road to Cincinnati; when completed, the length of both lines will be two hundred and nine miles; estimated to cost four and one half millions, represented as follows: Stock paid in, two millions. Bonds of the Company two and one-half millions; less than a million of the latter being convertible.

We now publish the following Appendix to the Circular mentioned, which exhibits some new facts with reference to the future prospects of this important link in the chain of railway communication between New York, and Cincinnati, Chicago and St. Louis. It will be observed that the actual receipts show a gratifying excess over the estimates of the President's Circular.

The Directors relied upon bringing into use, early in the autumn, so much of the Junction railway as lies between Sandusky and Ohio City; but unavoidable causes postponed the completion until the present month.

The earnings of the Southern line (excepting a few hundred dollars from the way business of the Northern line,) were as follows:

September	$36,878
October	57,253
	$94,131

At this rate, the annual gross receipts will be $564,000. Deducting running expenses from this, will leave $340,000 net earnings; from which after paying interest on the bonds issued for the construction of the Southern line, and the sixty finished miles of the Northern line, $249,000 will remain applicable to the dividends upon $2,000,000 of Stock—being over 12 per cent.

A large increase of revenue from the Northern line is expected to arise from the communication with Cincinnati, Hamilton, and Dayton railroads.

The work on the unfinished portion of the Northern line is far advanced. The iron has been purchased and is on the ground. All will be finished in season to connect with the Air line of the Northern Indiana railroad, which will be opened in September next.

The following persons compose the present Directory:

SAMUEL F. VINTON, of Ohio,
WILLIAM H. RUSSELL, of New York,
D. B. FEARING, of New York,
C. L. BOALT, of Ohio,
E. LANE, of Ohio,
WILLIAM JARVIS, Middletown, Conn.
E. B. LITCHFIELD, of New York.

Illinois and Michigan Canal.

On Monday last the trustees of the Illinois and Michigan canal paid the last instalment of the principal, with interest, of the canal loan of $1,600,000. The canal will now revert to the State, and be under exclusive State jurisdiction.

Finances of Georgia.

Governor Cobb has submitted his annual message to the State Legislature of Georgia. The locument is dated November 9th, 1853, and conains the following statement of the finances of the State up to that time.

On the twentieth day of October 1851, the public debt amounted to $1,687,472 22. By the act of December 4th, 1851, ratifying the contract of my predecessor and the Chief Engineer of the Western & Atlantic Railroad, for the purchase of iron for the State road, it was increased $200,000. By act of January 12th, 1852, providing for the repairs and equipment of said road, it was still further increased the sum of $525,000—and by the act authorizing a subscription to the Milledgeville and Gordon railroad, there was added the sum of $20,000, making the total amount of the State debt $2,432,472 22. To this amount should be added the bonded debt of the Central Bank, which is now $369,500; having been diminished by the payment of $5,500, since the 1st November 1851. The total liability of the State is thus seen to be $2,801,972 22, from which must be deducted the sum of $166,500, which has been paid during the past two years, under the provisions of the act of February 11th, 1850, providing for an annual Sinking Fund for the payment of the public debt. The present debt of the State therefore is $2,635,472 22.

Maine.

Kennebec and Portland Railroad.—The annual report of this company has been published, giving a statement of the condition, business and prospects of the road for the year ending Sept. 30th, 1853.

It states that the stock of the Yarmouth portion of the road has been arranged or exchanged so as to make it a six per cent stock instead of a ten per cent—that a large portion of the ten per cent preferred stock has also been surrendered or exchanged for new preferred stock bearing six per cent, and the hope is expressed that the balance of the old ten per cent stock will shortly be exchanged in a similar manner—the effect of the two arrangements being to save the company in the way of interest, about $15,000 annually.

The report states that the directors have entered into a contract with the Somerset and Kennebec railroad company for the lease of that road for twenty years, when completed on the conditions authorised, and heretofore made known.—The additional equipments required for the road, will occasion an outlay of $50,000.

The report of the treasurer makes the following exhibit of the financial condition of the road:

The total expenditures up to Sept. 30, 1853, have been as follows:

Now charged to construction		$1,755,506 03
Land damages		161,332 93
Fence account		31,385 29
Engine account		53,787 46
Car account		54,807 68
Interest in stock paid and to be paid to original stockholders to January, 1, '52	$118,000	
There will be a further payment of stock at par to contractors, of	70,900	
		188,900 00
Interest in preferred stock paid and to be paid to preferred stockholders to July 1, 1853		56,400 00
Amount to be paid to redeem the Yarmouth road		202,400 00
Sundry accounts		9,547
Total		$2,514,067

The means to meet the above expenditures have been derived from the following sources:

City and town loans	$755,000 00	
Company's bonds in place of Richmond and Bowdoinham	45,000 00	
		$800,000 00
Balance of bonds due Sept. 1, 1853, outstanding	4,800 00	
Bonds issued to Clapp, Dec. 10, 1850	12,000 00	
Bonds issued to Fuller, August 26, 1851	1,100 00	
		17,800 00
Bonds issued to October, 15, 1851	230,000 00	
Bonds issued to October 15, 1852	250,000 00	
		480,000 00
Preferred stock	178,115 06	
Partial payments on same.	12,408 21	
Stock interest paid and to be paid	56,400 00	
		246,923 27
Yarmouth road		202,400 00
Amount received of P. S. & P. R. R. Co. for 1000 shares, upon which six per cent dividends are guarantied		100,000 00
Bills payable		84,757 48
Original stock	603,606 52	
Add stock interest	118,000 00	
Add stock due contractors	70,900 00	
		792,506 52
Sundry accounts		19,997 21
Due to Reuel Williams for cash loaned		6,191 16
Due Edgerton and Marsh merged in G. S. Marsh's new contract, to be settled with him		17,661 59
		$2,768,237 23
Balance of Assets		$254,170 16

as follows, viz:

Amount charged commissioner's sinking fund	$37,750 00
Bonds pledged and on hand	177,200 00
Bills receivable	5,385 85
Due from station agents	6,475 58
Due from post office department	2,000 00
Fuel on hand	7,066 00
Stock in machine shop on hand	4,326 78
Cash in treasury	13,965 95
	$254,170 16

The receipts for the past year ending Sept. 30, have been as follows:

From 223,565 passengers	$127,127 72
From freight, 23,014 10-100 tons	33,604 55
From transportation of mails, expresses, etc., etc	7,381 61
	$168,113 88

Less running expenses as follows:

Maintenance of way	12,451 82
Locomotive power	13,338 38
Train expenses	9,992 55
Office establishment and salaries	8,538 84
Station expenses	7,687 84
Mail expenses	392 45
Fuel account	14,305 01
General expense	854 62
	$67,561 51
Net receipts for the year	$100,552 37

The foregoing receipts of the road for the year, $168,113 88, are exclusive of all amounts paid and due to other roads for their proportion of through fares.

At the annual meeting held at Brunswick on Thursday, the 27th ult., the old board of directors was re-elected, viz:

Reuel Williams, of Augusta, *President.*
John D. Lang, of Vassalborough.
Folliot T. Lally, of Farmingdale.
Wm. D. Sewall, of Bath.
Joseph M'Keen, of Brunswick.
Geo. F. Patten, of Bath.
Marshall F. Hagar, of Richmond.
A. H. Gilman, *Treasurer.*
Joseph M'Keen, *Sec. & Clerk.*

Western and Atlantic Railroad, of Georgia.

The report of the State Superintendent of this road exhibits its condition on the 30th September, 1853, and the more important particulars of its financial history from February 1st, 1852, as follows:

The available assets of the road, on the 1st of February, 1852, the date at which Mr. Wm. M. Wadley's Administration commenced, amounted to $37,907 59.

The amount of indebtedness, against the administration which preceded him, deducting the amount of assets, as above, was $551,595 27.

This amount does not cover all the indebtedness of the road on the 1st of February, 1852, as there are stil unsettled claims, for right of way, and losses prior to that date, the amount of which, when ascertained must be added to it.

The road, at the time that Mr. Wadley took the charge of it, besides being without proper organization or equipment, it will be seen, owed a debt of more than half a million of dollars; and the income of the road, together with the appropriation made by the last legislature, has been expended in cancelling this debt and in placing the road in good working condition, and thoroughly equipping it.

The following statement exhibits the financial operations of Mr. Wadley and his successor Mr. Yonge, from the 1st of February, 1852, to the 30th of September, 1853:

Available assets turned over by prior administration on 1st February, 1852		$37,907 59
Unavailable assets, being balances against former agents, in suit and doubtful		24,274 88
Proceeds of sale of bonds of the State, $525,000 000, and premiums on sale of same		579,513 28
Profits of the road for 20 months, say from 1st February, 1852, to 30th September, 1853		359,974 17
Amounts received to credit of railroad expenditures, being sales of material and bills of labor and repairs from machine and carpenter's shops against connecting roads, and services of runners and men on engines in employ of contractors and other roads, deducted from expenditures		9,268 43
Received for sales old iron		25,014 34
Balances to debit of agents and connecting roads, etc		241 00
Received for flange rail sold, to credit of construction account		1,853 80
		$1,038,047 44
Credited by amount paid on account of liabilities of road incurred prior to 1st of February, 1852		334,501 19
Amount paid for equipment and construction of road from 1st February, 1852, to 30th September, 1853,		548,208 85
By profit and loss account, fines by Post Office Department, etc.		120 50
By balance, being cash and cash assets on hand, as per statement below		125,216 90
		$1,038,047 44

The assets forming above balance are:

Cash in hands of Treasurer	$21,605 66
" banks	19,003 32
" assets	744 75
At credit at Philadelphia for iron delivered	8,475 99
Balance due by Post Office Department	3,500 00
Balance due by connecting roads and stage agents on account of through tickets	635 01
Balances due by agents of E. Tenn. and Georgia and Rome railroads, for Freight and expense bills	25,219 64
Balances due by other agents, for Freight and expense bills	26,757 75
Balances due by agents of prior administration, in suit and doubtful	24,274 88
	$125,216 90

Railroad Management---Precautions for Safety.

Since the public mind is no longer shocked by the recurrence of such accidents as made the early part of this year forever memoriable, it is well to exercise the same vigilance which such events inspire for a time immediately after their occurrence. The causes which tend to produce accidents are numerous and are in existence upon some of our best and oldest roads. They must be carefully watched and checked by every precaution. Winter is approaching, when road beds will be frozen and springs, wheels, and axles, will suffer more severe trials. Frost and ice will render the rails slippery and brakes will be tested more severely in controlling the motion of trains. Trains will be much oftener out of time, and irregular or extra trains will be more frequent on some roads. Time tables will be changed. The mid-winter and spring thaws will loosen stones and "slips" upon unprotected places in the tracks. All of these dangers will require prompt action in order that their probable results may be averted. Others, which have been suffered to threaten the safety of trains, and having their source in a deficiency of signals, insecurity of bridges, neglect in the inspection of wheels and axles, etc., must now be removed.

No company should neglect, upon the approach of winter, to order a thorough inspection of their equipment. Many renewals will be found expedient and in making these the merits of different manufacturers should be well considered. It is time that our roads should appreciate the quality rather than the price of their equipment.

At the commencement of last winter the Boston and Lowell railroad company had their axles examined throughout; generally by drawing off the wheels for a short distance from the shoulder. Defective axles were disclosed by this inspection, but being known they could be removed, while the remainder could be pronounced safe, and as such, could command the confidence of the company and of the public.

There is a large stock of carefulness which costs nothing and saves much. Good *signals* cost no more than poor ones, and but little in any point of view. Careful men can be had for the same price that many roads pay for careless hands.

When it is seen upon how much precaution the safety of railroad transportation depends, and what slight neglects may lead to the most fearful results, each company should see that its officers and agents neglect no means of safety.

Journal of Railroad Law.

ACTIONS FOR LOSS OF LUGGAGE.

By way of introducing the following note of a late decision in Virginia, it is proper to observe that the practice of permitting plaintiffs who bring actions for lost luggage, to testity as to the valus of the articles lost, seems to be fast extending itself in the different States of the Union. In some States this practice has been authorised by express statutes: as in our own State, in Michigan, in New Hampshire; in other States, Courts have deduced, (whether logically or not we need not inquire,) the propriety of permitting the unlucky looser of luggage to testify in his own behalf from the ancient principles of the common law. And the late learned Professor Greenleaf, of Massachusetts, (contrary, however, to Supreme Court of that State,) strongly favors the doctri ne that at common law, and independently of statute or party, may properly offer himself as a witness to show the value of the luggage for whose loss he has brought an action.

This doctrine is maintained in the *Maine Reports* (Greenleaf,) 1 vol. p. 27—in Pennsylvania in a variety of cases, especially 6 *Watts and Sergeant* 500, in 20 Ohio Reports, p. 310, and it has now, as will be seen, been sanctioned by a distinguished Judge in Virginia.

The doctrine, too, that a general notice is imperative to limit the legal responsibility of common carriers, unless such notice is brought directly home to the knowledge of the party who claims damages for the loss of his goods, and acquiesced in by him at the time of the delivery of his goods to the carrier, is now generally accepted. But the Supreme Court of the United States, the Superior and Common Pleas Courts of New York city, and other respectable tribunals have distinctly held that common carriers may limit their liability by express contracts with those who place goods in their charge for transportation.

The closing remark contained in the following note of the Virginia decision is also, we suppose, indisputably correct. Railway proprietors, and proprietors of all other modes of public conveyance are bound, so long as they have room and suitable conveniences, to transport just as many passengers together with their reasonable amount of luggage as request, at the ordinary stations, to be conveyed. Every common carrier is bound to find good vehicles and capable servants for the purpose of transporting freight or passengers or both, according to the advertisements which he publishes in relation to his business, and in fulfilment of the obligations towards the public which he has assumed. Nay, a carrier of passengers is legally bound to make reasonable provision not only for the safety but also for the *comfort* of those whom he undertakes to convey. See Story on Bailments section 375, where a variety of authorities are cited in support of this doctrine.

The carrier, however, may refuse to admit into his vehicles disorderly persons or those who refuse to submit to the rules which may be necessarily prescribed for the observance of travellers.

The duties and responsibilities of stage owners, railroad companies, etc., who undertake to carry passengers and their baggage for reward, are so generally misunderstood by those parties, as well as by the public, that it would seem not inappropriate to give publicity to a decision on the subject, by the circuit court for this city, at its present term, Judge Leigh presiding. A suit was brought against Farish & Co. ro recover the value of the contents of a trunk which had been cut from their stage and rifled. It appeared in evidence that the plaintiff delivered the trunk to the agents of the defendants and that it was put upon the stage at the time he got into it, and that a day or two after it should have reached its destination, it was found broken open, and most of the contents taken out. At this point, *the plaintiff himself* was introduced to prove, by his own oath, what the contents of the trunk were—to which the defendants' counsel objected, for, that no man could be a witness in his own case—and that the only exception to this general rule of evidence, was, when it was first proven that the carrier or his agents had been guilty of the robbery, and that the ground of the exception was the *odiam spoliatoris*—for the suppression of fraud. But it was ruled by the court that a foundation having been laid, by proof of the delivery to the defendants, and the loss, the plaintiff should be admitted to prove what was in the trunk, *from the necessity of the case*, for no gentleman is expected to show what he puts into his trunk. The court observed that this applied *only to wearing apparel*, which made the principle less dangerous. Goods sent by one merchant to another are invoiced, and the invoice is the proper evidence of what they were.

The defendants then offered to prove that a notice was kept posted conspicuously in their office, "All baggage at the risk of the owners"—that the same was printed in large letters at the top of the way bill, and that proclamation to the same effect was habitually made before the stages started from the offices. The plaintiff objected to the introduction of this evidence, on the ground that such notices did not limit the liability of carriers, whom the law regards *as insurers*, except against the act of the owner, the act of God, (a stroke of lightning, etc.,) or the act of public enemies. The court held that a carrier is liable, except as just stated, and that he cannot avoid that liability by notices. He may qualify it in respect to the place of delivery; or he may by such general notice require persons, when they take or send articles of great value in small compass, to acquaint him with the fact, that he may take greater care, for that would be but reasonable. If a special agreement that the carrier should not be responsible were proved, it might be a question whether that would remove his liability or not—but no general notice will.

It may be well to add a point which, though not arising in this case, is also generally misunderstood—viz: that a stage owner, etc-, has no right to refuse to take a person who will not agree to be responsible for his own baggage. They hold themselves out as offering to carry persons and their baggage for a certain sum, and the law regards the *fare* as a compensation for both the trouble and the risk. They are looked upon as *quasi* public officers, who have no right to make terms in respect to the performance of their duty, and are liable to an action for such refusal.

Counsel for the plaintiff, N. H. Campbell & R. G. H. Kean—for the defendants, Mosby & Speed.

Maysville and Lexington Railroad.

We are gratified to learn that the work on the Maysville and Lexington railroad, in spite of the severe pressure in the money market of New York, is still to be prosecuted with vigor, and that the Board of Directors expect to open forty-four miles of the road for business by the month of December next. The line is to be opened from Lexington to Millersburgh, a distance of twenty-seven miles, and from Maysville to Elizaville, a distance of seventeen miles; leaving only twenty-three miles, from Millersburg to Elizaville, to be completed. The graduation on this part of the line is heavy, but it is so far advanced that it is believed three or four month's work will prepare it for the iron. The arching of the tunnels on this latter division is progressing rapidly. The chairs and spikes for the whole road are either delivered or on the way from the factories, and the shipment of the remainder of the iron, purchased of the Brady's Bend Works on the Allegheny, is to commence next month. A large portion of the machinery necessary to operate the road is already delivered.—*Maysville Eagle.*

Locomotive "Connections."

We have endeavored in recent articles to show the disadvantage under which the motive power is operated upon roads which adhere to the "inside connected engine." The forcible manner in which this subject is presented, upon turning from roads having the best examples of locomotive machinery to such as retain the arrangements whose disadvantage we have often pointed out, cannot fail to convince any well informed mind that the latter roads suffer a great loss in the useful efficiency of their motive power and a large expenditure for repairs and renewals.

The *limits* which the inside connection imposes upon the useful proportions of locomotives has committed the motive power of the lines which adopt that connection to the short stroke and small wheel engine with low chimneys; and the consequent effects of diminished speed, increased wear and tear, and increased consumption of fuel.

It is also notorious that the engines, built in those quarters which stand most committed to this arrangement, are of cheaper construction both as regard materials and workmanship than in any other part of the country. Their proportions for efficient and economical working; such as allowance of steam room, steam openings, travel and adjustment of valves, etc.; are also inferior. Besides the limits which are generally the results of this arrangement there are very many incidental disadvantages such as the inferior construction of frames, truck frames, valve motions, etc., which must always attend the inside connection.

The action of such engines is more injurious to the road than outside connections, with level cylinders and counterbalanced drivers. This is because there is much more weight in the reciprocating parts and in the crank, which requires heavier balancing.

The inside connection involves too much complication, distortion of parts and expenditure of power. It limits the engine to a standard below the demands of a great traffic; limiting both the general proportions of boiler, cylinders and drivers, and also the details of the entire machinery.

It is only necessary to examine the motive power of different roads, and to note the practical results of the speed and economy attending the two arranegments to understand fully the justice of these strictures.

Census of Detroit.

The census of this city has just been completed by Mr. J. D. Johnson, for the Directory which he is about to publish. The result is as follows:

Total, of city proper	34,436
Add Spring Wells and Hamtramck, suburbs of the city	3,000
Total of city and suburbs	37,436
Males	17,165
Females	17,271

This shows an increase in the city population since 1850, a period of three years, of *thirteen thousand* which is unprecedented in the history of Detroit, and excelled by that of few other cities in the Union.

Public Buildings at Washington.

The corner-stone of the Capitol was laid by General George Washington, on the 18th of September, 1793.—The order of architecture is Corinthian. Original design by Dr. William Thornton, modified by B. H. Latrobe, architect, in 1830. Length of building 352 feet, breadth in centre 221 feet, at wings 121 feet. Height to top of balustrade 70 feet; grounds enclosed and improved, 30 acres. Total cost of the building and grounds $2,690,459 21. Rotunda 96 feet diameter, 96 feet high. Total height to the top of the great dome, 140 feet.—House of R presentatives, 90 feet long, 62 feet wide, 60 feet high. Senate Chamber, 75 feet long, 45 feet wide, and 45 feet high. Congressional Library room, 92 feet long, 34 feet wide, and 36 feet high. Supreme Court room 45 feet diameter, and 20 feet high.

It is well known that the two wings to the capitol (each 236 by 140 feet,) are in process of erection, but these are not included in the dimensions above given.

PRESIDENT'S HOUSE.—Roman Ionic; corner-stone laid September 18th, 1793. James Hoban, architect. Total cost of building and grounds, $600,000. Length 180 feet, breadth in centre 120 feet, at ends, 80 feet—height to top of balustrade 50 feet. East or grand reception room 79 by 48 feet, and 22 feet high. Hall of entrance 54 by 30 feet.

TREASURY BUILDING.—Grecian Ionic; corner-stone laid September 7, 1836. Designed and erected by Robert Mills, architect. Length of present buildings 336 feet, (when completed to be 500) breadth at centre 190 feet, 65 feet high, colonade, 336 feet long, 15 feet wide, and 65 feet high to top of balustrade. Cost $650,000.

PATENT OFFICE.—Grecian Doric; corner-stone laid September 7, 1835; original design by Town and Elliot, modified and erected by Robert Mills, architect.—Length of centre building 270 feet, breadth in centre 127 feet, at ends 70 feet, height 65 feet, grand portico 95 feet front. Cost $417,000. Total dimensions of original plan 430 feet by 300. Court in centre. Grand exhibition room 265 feet long, 63 feet wide, and 30 feet high. Model room 70 feet by 63 feet, and 16 feet high.

In addition to the above is the east wing; length 275 feet, height 60 feet; model or grand exhibition rooms 270 by 65 feet. The west wing which is now in process of erection, to be the same dimensions.

GENERAL POST-OFFICE.—Grecian (Italian;) corner-stone laid May 25, 1839; designed and executed by Robert Mills, architect. Lentgh of building 204 feet, breadth at wings 102 feet, at centre 60 feet, height 63 feet. Total cost $450,000.—*Wash. Republic.*

To Railroad Companies, Machinists, Car Manufacturers, etc., etc.

CHARLES T. GILBERT,
NO. 80 BROAD ST., NEW YORK,

IS prepared to contract for furnishing at manufacturer's prices—
Railroad iron,
Locomotive Engines,
Passenger and Freight Cars,
Car Wheels and Axles,
Chairs and Spikes.

Orders are invited; and all inquiries in relation to any of the above articles will receive immediate attention.

India-Rubber Railroad Car Springs, etc.

THE UNITED STATES CAR SPRING COMPANY, having completed their new Factory, are manufacturing and furnishing to *Railroad Companies*, and *Car Builders*, *RUBBER SPRINGS* of the best quality, on the most favorable terms.

Also, McMullen's superior *WHITE HOSE*, not only for Railroads, but all other purposes, and of any size or thickness required.

Office No. 25 Cliff street,
May 10, 1853. 3m New York.

Machinists' Tools.

A SUPERIOR CLASS,

DESIGNED particularly for Railroad work, manufactured by L. B. TING & CO., (late ALDRICH, TING & Co.,)
October 7, 1853. LOWELL, Mass.

To Locomotive Engine Builders and Engineers.

THE Proprietors offer for rent for a term of years, with immediate possession, the splendid property, known as the BELLEVILLE IRON WORKS, situated on the Mississippi, directly opposite the City of New Orleans, and within 300 feet of the River, with which it is connected by fine wharves and landings.

The buildings are of brick, with slated roofs, and were erected in 1848 at a very heavy expense; are of a most substantial and durable character and admirably fitted for a Foundry and Machine Shops, or almost any mechanical business. They now contain a new and powerful Engine and Boiler and sufficient machinery, say, planing machines—lathes—boring machines, blacksmith's tools, &c., &c., to employ 100 mechanics, and could be put in working order in a few days. The Buildings cover a lot 300 feet square and are amply large to receive the necessary machinery for the use of 800 to 1000 workmen.

The terminus and depot of the New Orleans, Opelousas and Great Western Railroad is situated about 300 yards from the above property, which could be availed of to] great advantage for the manufacture of Locomotives and Railroad work, generally as well as Steam Engines, Sugar Mills, and other descriptions of Machinery.

There are no Shops in New Orleans for the manufacture of Railroad Machinery, and as the Railroad Companies now organized in that city contemplate the construction of over 1000 miles of road,—a large part of which is already under contract,—the property now offered for lease offers a most eligible opportunity for parties desiring to contract to furnish the Engines and Machinery,—for those roads. Responsible contractors with their works on the spot would have an advantage over Northern Workshops in contracting for the Work of the Railroads terminating in New Orleans.

The Establishment and prospect of remunerating work to be secured immediately are worthy the attention of manufacturers and Engineers generally.

Applications from responsible parties will be promptly attended to, and to satisfactory parties the proprietors of the Works can offer favorable terms and arrangements.

Letters may be addressed to
R. B. SUMNER,
No. 61 Camp Street,
New Orleans;
and further information may be had by applying to Messrs. BARSTOW & POPE, Pine Street, New York.

A Valuable Farm in Illinois for Sale.

SITUATED in the *Village* of *Seward's Point* in *Montgomery* County 7¼ miles North of *Hillsborough*, about 36 South of *Springfield* the Capital of the State, about 18 West of the *Illinois Great Central Railroad*, about 4 or 5 North of the *Alton & Terre Haute Railroad* and about 18 miles West of the *intersection* of the two, containing 80 acres of rich prairie land.

Apply by letter or in person to
S. S. ROCKWELL,
No. 15 South Second str. Williamsburgh.

Railroad Iron.

TWO THOUSAND TONS Erie Pattern, 58 lbs. to the yard, already shipped, and expected here soon—for sale by
38tf JOHN H. HICKS, 90 Beaver st.

1300 Tons Yorkshire T rail, weighing 56 lbs. to the yard, and of a superior quality daily due and for sale by,
NAYLOR & CO.

Oxford Furnace, N. J.

ESTABLISHED A. D. 1743.

THE Subscriber manufactures and keeps constantly on hand for sale. every variety and size of Railroad Wheels made from the celebrated Oxford Iron. All orders addressed to CHAS. SCRANTON, Oxford Furnace P. O., will be attended to promptly.
Sept. 11, 1852. 1y*

Valuable Works on Railroads, Railway Engineering, Steam Engines, &c.

LARDNER'S RAILWAY ECONOMY, 1 vol.	$2 00
THE STEAM ENGINE, STEAM NAVIGATION, ROADS AND RAILWAYS, Explained and Illustrated by Dr. LARDNER, 8th Edition, revised and improved	2 00
TREDGOLD ON THE STEAM ENGINE, 3 vols., 4 to., ½ calf	50 00
TREDGOLD'S PRACTICAL TREATISE ON RAILROADS AND CARRIAGES	1 50
PORTWINE ON THE STEAM ENGINE	50
BURGOYNE'S ART OF BLASTING ROCKS, QUARRYING, &C	31
TREATISE ON TUBULAR AND GIRDER BRIDGES	31
BAKER'S LAND AND ENGINEERING SURVEYING	62
BAKER'S RAILWAY ENGINEERING AND EARTHWORK	1 50
PRIDEAUX ON ECONOMY OF FUEL	31
SEWELL ON STEAM AND LOCOMOTION Vol. 1	31
HERBERTS ENGINEERS AND MECHANICS ENCYCLOPEDIA, 2 Vols	9 50
GARRS RAILWAY LOCOMOTION AND STEAM NAVIGATION	1 75
TRAUTWINE ON EXCAVATIONS AND EMBANKMENTS	1 00

Imported and for sale by JOHN WILEY,
167 Broadway, New York.

N. York and N. Haven R. R.

NOTICE OF SUMMER ARRANGEMENTS,

Commencing Monday, May 9, 1853.

TRAINS FROM NEW YORK.	TRAINS TO NEW YORK.
7 A. M.—Accommodation to New Haven.	5.30 A.M.—Special, from Port Chester.
8 A. M.—Express for Boston, stopping at Stamford and Bridgeport.	5.00 A.M.—Commutation from New Haven.
	6.15 A.M.—Accommodation fm New Haven.
9.10 A.M.—Special for Port Chester.	8.15 A.M.—Accommodation fm New Haven.
11.30 A.M.—Accommodation for New Haven.	9.35 A.M.—Express from New Haven, Stopping at Bridgeport, Norwalk and Stamford.
3·00 P.M.—Express for New Haven, stopping at Stamford, Norwalk and Bridgeport.	1·07 P.M.—Boston Express, stopping at Bridgeport, Norwalk and Stamford.
4.00 P.M.—Accommodation for New Haven.	
5.00 P.M.—Express for Boston, stopping at N. Haven.	4.00 P.M.—Special, from Port Chester.
	4.00 P.M.—Accommodation fm New Haven.
5.35 P.M.—Commutation for N. Haven.	9.30 P.M.—Boston Express, stopping at Bridgeport, Norwalk and Stamford.
6.30 P.M.—Special for Port Chester.	

GEORGE W. WHISTLER, Jr., Sup't.
New Haven, May, 1853.

Stuart, Serrell & Co.,

CIVIL ENGINEERS,
Rooms 22, 24, 26 & 27,
157 Broadway, New York.

CHARLES B. STUART, EDWARD W. SERRELL,
DANIEL MARSH, SAMUEL MCELROY.

New Works on Civil Engineering.

THE Field Practice of laying out Circular Curves for Railroads.—By JOHN C. TRAUTWINE, Civil Engineer—2nd edition in pocket-book form.

A new and rapid method of Calculating the Cubic Contents of Excavations and Embankments, by the aid of Diagrams.—By John C. Trautwine, Civil Engineer—with 10 Copper Plates.

Price One Dollar each—postage on the Curves Three Cents—and on the Excavations and Embankments, Six Cents.

For sale by WILLIAM HAMILTON,
Hall of the Franklin Institute,
May 4, 1853. Philadelphia.

ESTABLISHED 1796.
McAllister & Brother,

OPTICIANS and Dealers in Mathematical Instruments, at the old established stand, 48 Chestnut street, Philadelphia, Pa. Mathematical Instruments separate and in cases, Protractors, Spacing Dividers, Drawing Pens, Ivory Scales, Tape Measures, Salometers, Spy Glasses, Microscopes, Spectacles, Hydrometers, Platina Points, Magic Lanterns, etc., etc., etc.

Our Illustrated and priced Catalogue is furnished on application and sent by mail free of charge.
Nov. 19, 186

$1,000,000 LITTLE MIAMI RAILROAD COMPANY SIX PER CENT. FIRST MORTGAGE BONDS FOR SALE.

OFFICE OF WINSLOW, LANIER & Co. }
No. 52 Wall-st., Oct. 6, 1853. }

THE LITTLE MIAMI RAILROAD COMPANY offer for sale one million of their SIX PER CENT. BONDS, with coupons. Interest and principal payable in New York, the former half-yearly, 1st of November and 1st of May. They are in sums of $1,000 each, payable the 1st day of May, 1858.

These Bonds are issued under the express authority of the Legislature of the State of Ohio; and are a part of the $1,500,000 Loan authorized to be issued by a vote of the stockholders, for the purpose of raising means to make a double track; the greatly increased and increasing business of the road makes this absolutely necessary.

The Little Miami Railroad is eighty-four miles long, commencing at the City of Cincinnati and terminating at Springfield; is now in complete running order; has cost, including equipments, stations, station-houses, &c., up to this date $2,708,109 19.

This Company hold stock in the Columbus and Xenia Railroad Company to the amount of $386,000, which now commands a premium of 20 per cent. Also, in the Hillsborough Road the amount of $11,716.

The receipts of the Road have been as follows:

For the year ending Dec. 1, 1844.....	$18,623 36
For the year ending Dec. 1, 1845.....	46,327 58
For the year ending Dec. 1, 1846.....	116,052 02
For the year ending Dec. 1, 1847.....	221,139 52
For the year ending Dec. 1, 1848.....	280,085 78
For the year ending Dec. 1, 1849.....	321,398 82
For the year ending Dec. 1, 1850.....	405,597 24
For the year ending Dec. 1, 1851.....	487;845 89
For the year ending Dec. 1, 1852.....	526,746 35
The receipts from Dec. 1, 1852, to Sept. 1, 1853, 10 months were.....	544,625 59
For the same period year before.....	411,797 06
Increase in 10 months.....	$132,823 53

The position of this road, being the natural, shortest and most usually travelled route from Cincinnati and the vast country south and west of it, to the northern cities, must ever make it one of the most important and profitable lines in the country.

An inspection of a map will show its connections to be many and important. This road operates the Columbus and Xenia Road, and runs in connection with the Cleveland and Columbus Road; in fact they are now run as one line greatly to the advantage of all.

Regular annual 10 per cent. dividends have been declared since December, 1847, with an extra dividend of 5 per cent. in 1852. In 1852 two cash dividends of 5 per cent. were made.

The present surplus and reserve fund amounts to.....	$98,546 10
The mortgage covers the entire line of road, costing to date...	2,708,108 19
To be expended on double track, &c.....	1,500,000 00
Value of security.....	$4,208,109 19

The security for the payment of these Bonds is one of the most ample character, being a first and only mortgage or deed of trust (excepting one of $100,000 to the City of Cincinnati) on the Company's Road, Stations, Franchises, net income, &c., to J. F. D. LANIER, Esq., of this city, in trust for the bondholders, with ample power to take possession of the Road, its real and personal estate, franchises, &c., and to sell the same to the highest bidder for cash, if default be made in payment of interest or principal. The mortgage is for $1,500,000, and cannot be increased.

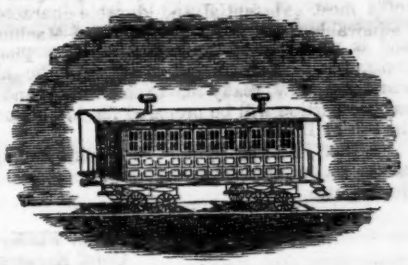
The Stock owned by the Road in the Columbus and Xenia and Hillsborough Railways will much more than pay off the $100,000 prior lien to the City of Cincinnati, and all other debts of the Company, excepting this loan of $1,500,000.

These Bonds are offered at private sale by the undersigned, Agents of the Company.

Printed statements of the affairs of the Company, and any further information relative to the securities, will be given by

WINSLOW, LANIER & CO.,
No. 52 Wall-st.

Elmira Car Manufactory.



THE Undersigned is prepared to manufacture for Railroad Companies, Passenger, Baggage, Cattle, Freight, Gravel and Hand Cars, also Baggage Barrows and Freight Trucks.

WM. E. RUTTER.

Elmira, N. Y., June 1, 1853.

The Hamilton Car Company,

ARE prepared to Contract for the Manufacture to order Rail Road Cars of every description, such as Passenger, Baggage, Freight, Dumping and Hand Cars, &c. &c.

Having ample facilities for Manufacturing at the lowest rates, and being supplied with Eastern Mechanics in every department under the Superintendance of H. P. Lanckton, who has had charge of T. W. Wason's well known establishment at Springfield Mass., for the last Six years, we can guaranty ours to be equal in style and quality to any manufactured.

Car Manufacturers and Rail Road Companies Supplied with Car wheels from the most approved patterns at the lowest prices. Castings of all kinds for Cars, Rail Road Bridges, &c. made to order at short notice.

Orders Respectfully Solicited.

Address, HENRY SIZER, *Agent*,
Cincinnati Ohio.

Office 596 Fifth Street, Cincinnati, at Rail Road Depot Building.

Railroad Car Works.

THE Undersigned are prepared to manufacture for Railroad Companies, Passenger, Baggage, Cattle, Freight, Gravel and Haod Cars, also Baggage Barrows and Freight Trucks.

F. HUNGERFORD & CO.

Maysville, Ky., Sept. 29, 1853.

Hufty's

Engineers, Architects and Draftsmen's

STATIONERY EMPORIUM.

WHATMAN'S Turkey Mill Drawing paper, Tracing paper, Plan and Profile, Protracters, Drawing Pins, Faber's, Jackson's and other makers' Pencils; Field, Level, and Memorandum Books of various patterns; Mathematical Instruments, Tape-lines, Mouth Glue, Cross Section paper, Triangles, Sabel Brushes, Gum Bands, Maiden Gum, Red Tape, Ink, Inkstands and Sand, Water Colors, Pallets, Patent Binders for letters, Portfolios, etc., together with a general assortment of Stationery and Blank Books.

All goods packed with care, and forwarded to any part of the United States.

JOSEPH HUFTY,
Successor to H. L. Lipman,
139 Chestnut st., Philadelphia.

May 15, 1851.

Buffalo Car Works.

TOWNSEND & COIT, Proprietors.

WE are now erecting an extensive Establishment for the manufacture of Railroad Cars, which will be furnished with all the conveniences known to the business, and ready for operation by the 1st day of June next, at which time we will be ready to execute orders for Baggage, Box, Platform and Cattle Cars, of the most approved style and finish. Meantime we are prepared to make contracts for work to be furnished during the summer and fall.

TOWNSEND & COIT, Buffalo.

February 23, 1853.

A. N. GRAY, Cleveland, O.,

RECEIVER AND FORWARDER of Railroad Iron, Chairs and Spikes

Also, Cars, Locomotives, and all kinds of Machinery for Railroad purposes.

Office next door to the Custom House, Main st.

January 12, 1853.

SIXTY MILES DISTANCE SAVED!—ONLY THIRTY-SIX AND A HALF HOURS TO CHICAGO.

MICHIGAN SOUTHERN RAILROAD LINE, carrying the Great Western U. S Through Mail—FOR CHICAGO AND ST. LOUIS, MILWAUKEE, RACINE KENOSHA, and all Ports on Lake Michigan.—Through from Buffalo to Monroe IN FOURTEEN HOURS WITHOUT LANDING.

The following magnificent and unequalled steamers from the line between Buffalo and Monroe:

EMPIRE STATE, J. WILSON, Commander, leaves Buffalo Mondays and Thursdays.

SOUTHERN MICHIGAN, A. D. PERKINS, Commander, leaves Buffalo Tuesdays and Fridays.

NORTHERN INDIANA, I. T. PHRATT, Commander, leaves Buffalo Wednesdays and Saturdays.

One of the above splendid steamers will leave the Michigan Southern Railroad Line Dock, at 9 o'clock, P. M. every day, (except Sundays) and run direct through to Monroe without landing, in 14 hours, where the Lightning Express Train will be in waiting to take passengers direct to Chicago in 8 hours; arriving next evening after leaving Buffalo.

THE LAKE SHORE RAILROAD.

runs in connection with this line, forming the only continuous line of Railroad to Chicago and the Illinois River.

For Through Tickets, by New-York and Erie and Buffalo and New-York City Railroad via Buffalo, or by the People's Line of Steamboats, Hudson River Railroad via Albany and Buffalo, apply to

JOHN F. PORTER, Agent,
No. 193 Broadway, corner Dey-st., N. Y.

MONTREAL & NEW YORK AND Plattsburgh and Montreal RAILROADS.

☞ *Open through from Plattsburgh to Montreal.* ☜

Passenger Trains leave Montreal for Plattsburg at 6 30 a.m and 5 p.m., arrive at 8 a.m, and 7.30 p.m.

Leave Plattsburg for Montreal 7.30 a.m. and 4 p.m., arrive a 10 a.m. and 6.50 p.m.

Trains connet at Montreal with Steamers for Quebec, and the St. Lawrence and Atlantic Railroad for Sherbrooke and intermediate station.

Trains connect at Moocrs Junction with Northern (Ogdensburgh) Railroad for Ogdensburgh and Lake Ontario Steamers for Lewiston, Niagara Falls and Upper Canadia, and all ports on the Western Lakes.

Trains connect at Plattsburgh by Steamer to Burlington with Rutland and Rurlington Railroad and connecting lines for Troy, Albany, New York and Boston, and all intermediate stations. Also with steamers for Whitehall to the Saratoga and Washington Railroad, and connecting lines of road to Troy, Albany and New York.

Passengers will find this route unequelled for comfor and dispatch, and attended with lessf atigue and dely than any other. It possesses moreover the advantage of a short Ferriage of only *fifteen minutes* across the River St. Lawrence at Caughnawaga, which has never been known to freeze, and can be confidently relied upon at all seasons of the year.

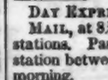
☞ Frieght Tarins run daily each way.

For particulars see Frieght and Passenger Tariff.

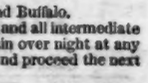
BAGGAGE *checked through.*

H. W. NELSON, Superintendent.

New York and Erie R. R.



PASSENGER TRAINS
leave Pier foot of Duane street,
as follows, viz:—



DAY EXPRESS, at 6 a. m, for Dunkirk and Buffalo.

MAIL, at 8¼ a.m. for Dunkirk and Buffalo, and all intermediate stations. Passengers by this train will remain over night at any station between Binghamton and Corning, and proceed the next morning.

ACCOMMODATION, at 12½ p.m. for Delaware and all intermediate stations.

WAY, at 3¼ p.m. for Delaware and all intermediate stations.

NIGHT EXPRESS, at 5 p. m. for Dunkirk and Buffalo.

EMIGRANT, at 6 p.m. for Dunkirk and all intermediate stations.

On Sundays only one Express Train—at 5 p.m.

The Express Trains connect at Dunkirk with the Lake Shore Railroad for Cleveland, Cincinnati, Chicago, etc., and at Buffalo with first class splendid steamers for Cleveland, Sandusky, Toledo, Detroit and Chicago.

CHAS. MINOT, Sup't.

HENRY TANNER vs. *the Hudson River Railroad Company.* — Circuit Court of the United States for the Northern District of New York.

THIS was a suit brought by the plaintiff for an alleged infringement of letters patent granted to him as assignee of the inventors, L. H. THOMPSON and A. G. BACHELDER: 'for an improved Railroad Brake', by the use on the said road of brakes made on plans, alleged to have been invented by NEHEMIAH HODGE and also by F. A. STEPHENS and purchased by the said defendants, from the said Hodge & Stephens and also for use of the plan as patented to said Tanner.

The suit was noticed for trial at the October term of 1853, and put over the term by the motion of Defendant's Counsel by paying the costs of the term.

And thereafter the Defendant's Counsel made overtures for a settlement which resulted in the defendant's acknowledging the validity of plaintiff's patent, the infringement of the said patent by the use of double acting brakes on the plan of the said patents, and the Company paying to the said plaintiff for the right to use the said invention and for the withdrawal of said suit the sum of ONE THOUSAND DOLLARS and costs.

Having read the above I do certify to the correctness of the statements therein contained.

October 25th, 1853.

THOMAS M. NORTH,
Secret'y and Attorney of the
Hudson River R. R. Co.

New York, October 26th, 1853.

This is to certify that I was of Counsel for the plaintiff in the above entitled cause, that the suit was brought for the recovery of damages from the Hudson River Railroad Company for the use on their cars of brakes, made on the plans described in the patents granted to Charles B. Turner on the 14th, of Nov. 1848, to Nehemiah Hodge on the 2d, of October 1849, and to F. A. Stephens on the 25th, of November 1851. That in preparing for the trial of the above entitled cause I made a careful examination of all the facts, given in the notice of defence and became satisfied that Thompson and Bachelder, from whom Tanner derived title, were the original and first inventors of the Double acting Brake covered by the plaintiff's patent and that the Brakes of Turner, of Hodge, and of Stephens are infringments of the said Tanner's patent. CHS. M. KELLER.

CORROSIVE SUBLIMATE.

THIS article now extensively used for the preservation of timber, is manufactured and for sale by POWERS & WEIGHTMAN, manufacturing Chemists, Philadelphia.

Jan. 20, 1849.

Drawing.

B. BLANDOWSKI, Topographical and Ornamental Draughtsman and Designer. Maps accurately drawn, enlarged or reduced from notes or copies. Ornamental designs for decorations, furniture, fences and ornamental foundry work. Architectural designs. Drawings from nature carefully prepared.

REFERENCES. Messrs. Miller and Freund, Ligneous Marble Works, corner of Franklin and Center streets, New York. Also H. V. Poor, Esq., Editor Railroad Journal, and Zerah Colburn, Assistant do.

Address, care of Railroad Journal, 9 Spruce street New York.

Henry I. Ibbotson,

MANUFACTURER OF

FILES AND SAWS,

Warranted of superior quality.
Office and Warehouse, 218 Pearl st., New York.

Railroad Iron.

2,000 TONS FIRST CLASS WELSH RAILWAY IRON, to be made to any ordinary T pattern required by the buyers, and for shipment from Newport, Wales, in December, January, and March next, apply to the undersigned, for many years connected with the largest house in the trade.

JOHN H. AUSTIN & CO.,
6tf 2 Ingram Court, Fenchurch street London.

Notice to Contractors.

COVINGTON & OHIO RAILROAD.

PROPOSALS will be received, at the Office of the Covington and Ohio Railroad, in Covington, until the 15th of December next, for the graduation and masonry of about seventy-five miles of the above road; of which, the eastern portion, comprising fifty miles, lies next west of Covington, and the western portion, consisting of about twenty-five miles, lies between the Kanawha River and the mouth of Big Sandy. A large share of the work to be let—including bridging and tunnelling—is heavy and desirable, and is well worthy the attention of responsible contractors. The western sections of the above work are now ready for examination, and the eastern portion will be prepared for inspection by the 8th of December.

Further information may be obtained on application at the company's offices at Covington and Guyandotte

By order of the Board,
CHARLES B. FISK,
Chief Engineer.

N. B.—The Board of Public Works, of Virginia, under whose direction the Covington and Ohio Railroad is to be constructed, on State account, will meet, at Covington, on the 15th of December, above named, for the purpose of receiving and acting on the proposals that may then be offered.

Nov. 10th, 1853.

To Railroad Companies.

COLLINS' PATENT

VENTILATORS,

FOR

Ventilating all kinds of

PUBLIC AND PRIVATE BUILDINGS

Railroad Cars, Depots, etc.

THE Subscribers would invite the attention of the public to the above celebrated Patent Ventilator. This Ventilator is the best one now known of, for giving a pure air in rooms, and ejecting all foul air. It has been adopted by all the principal Railroad Companies and Car Factories, and is extensively used for private dwellings, and for the cure of smoky Chimneys cannot be excelled. Manufactured and for sale by

BAKER & WILLIAMS,
No. 406 Market st., Girard Row,
Sole Agents for Pennsylvvnia.

CERTIFICATES.

Engineer Department P.R.R., Altoona, Feb. 8, 1853.

This is to certify that Messrs. BAKER & WILLIAMS, of 406 Market st., Philadelphia, have furnished a large number of Collins' Patent Galvanized Iron Ventilators for the P. R.R. Co., and that they have given every satisfaction, acting fully as represented. I consider them as a necessary appendage to an Engine House. We have them in use thirteen inches, and two feet diameter, acting equally well. So well satisfied am I of their usefulness, that the Engine Houses we are about building will be supplied with them at every point where a draft is necessary to free building of smoke. STRICKLAND KNEASS,
Principal Assistant Engineer P. R.R. Co.

Engineer Depart. P. R.R. Co., Pittsburgh, May 12, 1853.

Messrs. BAKER & WILLIAMS,

Dear Sirs—The 23 Collins' Patent Ventilators furnished by you for the Engine House at this place, have been in use several months and their merits have been fully tested and have given most perfect satisfaction; being constructed on true principles of Ventilation, and the workmanship is of a substantial and superior character. Yours truly, OLIVER W. BARNES,
3m40 *Principal Assistant Engineer P. R.R. Co.*

Krupp's

CELEBRATED CAST STEEL,

Which obtained the Council Medal at the London Exhibition in 1851.

Warranted unapproachable as to Quality and Size.

PLATERS and other Cast-Steel Rollers, of any dimensions not exceeding six feet long by eighteen inches diameter.

Piston Rods and Shafts for Steam Engines, not exceeding 3000 lbs. in weight.

Railway and other Axles, Cranks, Springs and Tyres.

Cannon, Rifle and Gun Barrels.

Mint and other Rolling Mills

Orders received by

THOMAS PROSSER & SON,
28 Platt street, New York.

Sole Agents for the United States.

Nov. 19, 1853.

To Contractors.

CHIEF ENGINEER'S OFFICE, N. & P. R. R. Co.,
Norfolk, Oct., 13, 1853.

SEALED PROPOSALS will be received by the undersigned at this office from the 3d, until the 15th day of December next, at noon, for the *graduation and masonry of* 62 *miles* of the Norfolk & Petersburg railroad between the city of Norfolk and *Warwick Swamp in the county of Sussex.*

The line will be divided into sections of about 4 miles, and bids will be received for one or more of said sections.

Maps and profiles of the line will be ready for inspection and specifications with forms of proposals may be had of the undersigned on and after the first day of December.

Payments will be made in current money during the progress of the work in proportion of four-fifths of the amount due.

As soon as practicable after the examination of the proposals, those to whom the work will be allotted will be duly notified, and if deemed necessary required to give bond with satisfactory security for an amount not exceeding one-tenth of the amount of work to be done.

The company reserves the right to accept such proposals as in their judgment will secure the prompt and faithful execution of the work according to contract, or reject all, if none are satisfactory.

The line is easy of access, the country through which it passes is of mild climate and abundant in supplies. *Postage on all communications must be prepaid.*

W. MAHONE,
Chief Engineer.

Small Rails.

THE SUBSCRIBERS manufacture and keep constantly for sale, *Light Rails* of the most approved patterns, weighing 22, 25, 28, 40 and 50 lbs per yard, suitable for Colliers, Miners, Quarrymen and Contractors, or for turn outs, depot and branch tracks. CHARLES E. SMITH & Co.

1744 Fairmount Iron Works, Philadelphia.

CHAS. E. SMITH, HENRY MORRIS,
THOS. T. TASKER, WISTAR MORRIS.

To Contractors.

PROPOSALS will be received till sunset Nov. 21st for the Graduation, Masonry, and Superstructure of the CLINTON LINE EXTENSION RAILROAD from Hudson to its intersection with the Mad River Railroad, a distance of about one hundred miles. The route occupies a perfectly healthy country, thickly inhabited, and accessible at all points.

Also, at the same time, for the construction of the portion of the Clinton Line Railroad not under contract extending to the Ohio and Pennsylvania State Line.

Specifications, Maps and Profiles will be ready for examination ten days before the letting at the Engineer's office in Hudson.

H. N. DAY, President.
W. B. BRINSMADE, Chief Eng'r.

Hudson, Ohio, Oct. 10th, 1853.

Book and Job Printing.

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